Transfer Switches

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Automatic Transfer Switches

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Learn Online

Product Selection Guide

Transfer Switch Product

Catalog Numbering System	Automatic Contactor (600 Vac) (40–1200A)			Bypass Isolation Contactor (600 Vac) (100–1200A)		Manual Molded Case Switch (600 Vac) (30–1000A)		
Type	AT = Automatic CT = Closed transition NT = Non-Automatic Refer to **Page 8**			BI = Bypass isolation open transition CB = Bypass isolation closed transition Refer to **Page 16**		MT = Manual Refer to **Page 26**		
Orientation	V = Vertical			V = Vertical		H = Horizontal V = Vertical		
Logic	1 = ATC-100 3 = ATC-300 8 = ATC-800			3 = ATC-300 8 = ATC-800		X = No Logic		
Frame	C = Contactor-based 2 = Two-position mechanism 3 = Three-position mechanism			C = Contactor-based 3 = Three-position mechanism		Molded case device FD = 30–150A KD = 150–300A LD = 400–600A	MD = 600–800A NB = 800–1000A	
Switch	X = Fixed mount			E = Drawout X = Fixed mount		Fixed mount A = FM, N (MCS), E (MCS) B = FM, N (MCB), E (MCB)	C = FM, N (MCB), E (MCS) D = FM, N (MCS), E (MCB)	
Poles	2 = Two-pole 3 = Three-pole 4 = Four-pole			2 = Two-pole 3 = Three-pole 4 = Four-pole		2 = Two-pole 3 = Three-pole 4 = Four-pole		
Amperes	0040 = 40A 0080 = 80A 0100 = 100A 0150 = 150A	0200 = 200A 0225 = 225A 0260 = 260A 0400 = 400A	0600 = 600A 0800 = 800A 1000 = 1000A 1200 = 1200A	0100 = 100A 0150 = 150A 0200 = 200A 0260 = 260A	0400 = 400A 0600 = 600A 0800 = 800A 1200 = 1200A	0030 = 30A 0070 = 70A 0100 = 100A 0150 = 150A	0225 = 225A 0300 = 300A 0400 = 400A	0600 = 600A 0800 = 800A 1000 = 1000A
Voltage	A = 120V, 60 Hz B = 208V, 60 Hz E = 600V, 60 Hz	G = 220V, 50/60 Hz X = 480V, 60 Hz H = 380/220, 50/60 Hz		A = 120V, 60 Hz B = 208V, 60 Hz E = 600V, 60 Hz	G = 220V, 50/60 Hz X = 480V, 60 Hz H = 380/220, 50/60 Hz	E = 600V, 60 Hz		
Enclosure	K = Open S = NEMA 1 R = NEMA 3R J = NEMA 12			S = NEMA 1 R = NEMA 3R		K = Open S = NEMA 1 J = NEMA 12	R = NEMA 3R L = NEMA 4 D = NEMA 4X	
Listing	U = UL listed R = UL recognized X = No listing			U = UL listed R = UL recognized X = No listing		U = UL listed R = UL recognized X = No listing		

Key: DO = Drawout
FM = Fixed mounted
MPB = Magnum power breaker
MPS = Magnum power switch
MCB = Molded case breaker
MCS = Molded case switch

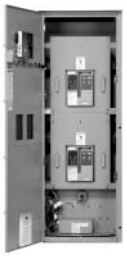
Transfer Switch Product Guide, continued

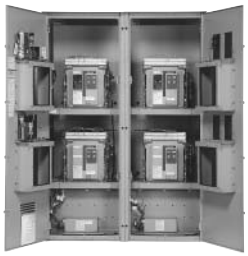
Catalog Numbering System	Non-Automatic Molded Case Switch (600 Vac) (30–4000A)	Automatic (Wallmount) Molded Case Switch (600 Vac) (30–1000A)	Maintenance Bypass (480 Vac) (100–1000A)
Type	NT = Non-automatic Refer to **Page 30**	AT = Automatic Refer to **Page 33**	MB = Maintenance bypass Refer to **Page 39**
Orientation	H = Horizontal V = Vertical	H = Horizontal V = Vertical	H = Horizontal
Logic	E = Electromechanical	1 = ATC-100 3 = ATC-300 I = ATC-600	E = Electromechanical
Frame	Molded case device FD = 30–150A KD = 150–300A LD = 400–600A MD = 600–800A NB = 800–1000A	Molded case device FD = 30–200A KD = 150–300A LD = 400–600A MD = 600–800A NB = 800–1000A (FD = 200A available on ATH3 only)	Molded case device FD = 100–150A KD = 150–300A LD = 400–600A MD = 600–800A NB = 800 –1000A
Switch	Fixed mount A = FM, N (MCS), E (MCS) B = FM, N (MCB), E (MCB) C = FM, N (MCB), E (MCS) D = FM, N (MCS), E (MCB)	Fixed mount A = FM, N (MCS), E (MCS) B = FM, N (MCB), E (MCB) C = FM, N (MCB), E (MCS) D = FM, N (MCS), E (MCB)	Fixed mount A = FM, N (MCS), E (MCS)
Poles	2 = Two-pole 3 = Three-pole 4 = Four-pole (four-pole—3000A maximum)	2 = Two-pole 3 = Three-pole 4 = Four-pole	2 = Two-pole 3 = Three-pole 4 = Four-pole
Amperes	0030 = 30A 0070 = 70A 0100 = 100A 0150 = 150A 0225 = 225A 0300 = 300A 0400 = 400A 0600 = 600A 0800 = 800A 1000 = 1000A	0030 = 30A 0070 = 70A 0100 = 100A 0150 = 150A 0200 = 200A 0225 = 225A 0300 = 300A 0400 = 400A 0600 = 600A 0800 = 800A 1000 = 1000A	0100 = 100A 0150 = 150A 0225 = 225A 0300 = 300A 0400 = 400A 0600 = 600A 0800 = 800A 1000 = 1000A
Voltage	A = 120V, 60 Hz B = 208V, 60 Hz E = 600V, 60 Hz G = 220V, 50/60 Hz H = 380V, 50 Hz K = 600V, 50 Hz O = 415V, 50 Hz W = 240V, 60 Hz X = 480V, 60 Hz	A = 120V, 60 Hz B = 208V, 60 Hz E = 600V, 60 Hz G = 220V, 50/60 Hz H = 380V, 50 Hz K = 600V, 50 Hz O = 415V, 50 Hz W = 240V, 60 Hz X = 480V, 60 Hz	A = 120V, 60 Hz B = 208V, 60 Hz W = 240V, 60 Hz X = 480V, 60 Hz
Enclosure	K = Open S = NEMA 1 R = NEMA 3R J = NEMA 12 L = NEMA 4 D = NEMA 4X (J, L and D 65 kAIC, 1200A and below only)	K = Open S = NEMA 1 J = NEMA 12 R = NEMA 3R L = NEMA 4 D = NEMA 4X	K = Open S = NEMA 1 J = NEMA 12 R = NEMA 3R L = NEMA 4 D = NEMA 4X
Listing	U = UL listed R = UL recognized X = No listing	U = UL listed R = UL recognized X = No listing	U = UL listed R = UL recognized X = No listing

Key: DO = Drawout
FM = Fixed mounted
MPB = Magnum power breaker
MPS = Magnum power switch
MCB = Molded case breaker
MCS = Molded case switch

16

Transfer Switch Product Guide, continued





Catalog Numbering System	Automatic (Free Standing) (600 Vac) (600–5000A)		Automatic Closed Transition (<100 ms) (600 Vac) (600–5000A)		Bypass Isolation (600 Vac) (800–5000A)	
Type	AT = Automatic Refer to **Page 42**		CT = Closed transition Refer to **Page 44**		BI = Open translation bypass isolation Refer to **Page 51**	
Orientation	V = Vertical		V = Vertical		V = Vertical	
Logic	I = ATC-600		I = ATC-800 Closed transition		I = ATC-600	
Frame	Power case device (Magnum) MG = 600–5000A		Power case device (Magnum) MG = 600–5000A		Power case device (Magnum) MG = 600–5000A	
Switch	Fixed mount A = FM,N (MPS), E (MPS) B = FM, N (MPB), E (MPB) C = FM, N (MPB), E (MPS) D = FM, N (MPS), E (MPB)	Drawout mount E = DO, N (MPS), E (MPS) F = DO, N (MPB), E (MPB) G = DO, N (MPB), E (MPS) H = DO, N (MPS), E (MPB)	Fixed mount A = FM, N (MPS), E (MPS) B = FM, N (MPB), E (MPB) C = FM, N (MPB), E (MPS) D = FM, N (MPS), E (MPB)	Drawout mount E = DO, N (MPS), E (MPS) F = DO, N (MPB), E (MPB) G = DO, N (MPB), E (MPS) H = DO, N (MPS), E (MPB)	Drawout mount E = DO, N (MPS), E (MPS) F = DO, N (MPB), E (MPB)	G = DO, N (MPB), E (MPS) H = DO, N (MPS), E (MPB)
Poles	2 = Two-pole 3 = Three-pole 4 = Four-pole		2 = Two-pole 3 = Three-pole 4 = Four-pole (four-pole—3000A maximum)		2 = Two-pole 3 = Three-pole 4 = Four-pole	
Amperes	0600 = 600A 0800 = 800A 1000 = 1000A 1200 = 1200A 1600 = 1600A 2000 = 2000A	2500 = 2500A 3000 = 3000A 3200 = 3200A 4000 = 4000A 5000 = 5000A	0600 = 600A 0800 = 800A 1000 = 1000A 1200 = 1200A 1600 = 1600A	2000 = 2000A 2500 = 2500A 3000 = 3000A 4000 = 4000A 5000 = 5000A	0800 = 800A 1000 = 1000A 1200 = 1200A 1600 = 1600A	2000 = 2000A 2500 = 2500A 3200 = 3200A 4000 = 4000A 5000 = 5000A
Voltage	A = 120V, 60 Hz B = 208V, 60 Hz E = 600V, 60 Hz G = 220V, 50/60 Hz H = 380V, 50 Hz K = 600V, 50 Hz	O = 415V, 50 Hz W = 240V, 60 Hz X = 480V, 60 Hz	A = 120V, 60 Hz B = 208V, 60 Hz E = 600V, 60 Hz G = 220V, 50/60 Hz H = 380V, 50 Hz K = 600V, 50 Hz	O = 415V, 50 Hz W = 240V, 60 Hz X = 480V, 60 Hz	A = 120V, 60 Hz B = 208V, 60 Hz E = 600V, 60 Hz G = 220V, 50/60 Hz H = 380V, 50 Hz K = 600V, 50 Hz	O = 415V, 50 Hz W = 240V, 60 Hz X = 480V, 60 Hz
Enclosure	K = Open (up to 3200A) S = NEMA 1 R = NEMA 3R T = NEMA 1 (through the door)		K = Open (up to 3200A) S = NEMA 1 R = NEMA 3R T = NEMA 1 (through the door)		S = NEMA 1 R = NEMA 3R (non-walk-in) T = NEMA 1 (through the door)	
Listing	U = UL listed R = UL recognized X = No listing		U = UL 1008 listed X = No listing		U = UL 1008 listed X = No listing	

Key: DO = Drawout
FM = Fixed mounted
MPB = Magnum power breaker
MPS = Magnum power switch
MCB = Molded case breaker
MCS = Molded case switch

Transfer Switch Product Guide, continued

Catalog Numbering System	Closed Transition Bypass Isolation (<100 ms) (600 Vac) (800–5000A)		Closed Transition Soft Load (600 Vac) (800–5000A)	
Type	CB = Closed transition bypass isolation Refer to **Page 51**		CT = Closed transition soft load Refer to **Page 57**	
Orientation	V = Vertical		V = Vertical	
Logic	I = ATC-800 Closed transition		C= Soft Load	
Frame	Power case device (Magnum) MG = 600–5000A		Power case device (Magnum) MG = 600–5000A	
Switch	Drawout mount E = DO, N (MPS), E (MPS) F = DO, N (MPB), E (MPB)	G = DO, N (MPB), E (MPS) H = DO, N (MPS), E (MPB)	Drawout mount E = DO, N (MPS), E (MPS) F = DO, N (MPB), E (MPB)	G = DO, N (MPB), E (MPS) H = DO, N (MPS), E (MPB)
Poles	2 = Two-pole 3 = Three-pole 4 = Four-pole		2 = Two-pole 3 = Three-pole 4 = Four-pole	
Amperes	0800 = 800A 1000 = 1000A 1200 = 1200A 1600 = 1600A	2000 = 2000A 2500 = 2500A 3200 = 3200A 4000 = 4000A	0800 = 800A 1000 = 1000A 1200 = 1200A 1600 = 1600A	2000 = 2000A 2500 = 2500A 3000 = 3000A 4000 = 4000A
Voltage	A = 120V, 60 Hz B = 208V, 60 Hz E = 600V, 60 Hz G = 220V, 50/60 Hz H = 380V, 50 Hz K = 600V, 50 Hz	O = 415V, 50 Hz W = 240V, 60 Hz X = 480V, 60 Hz	A = 120V, 60 Hz B = 208V, 60 Hz E = 600V, 60 Hz G = 220V, 50/60 Hz H = 380V, 50 Hz K = 600V, 50 Hz	O = 415V, 50 Hz W = 240V, 60 Hz X = 480V, 60 Hz
Enclosure	S = NEMA 1 R = NEMA 3R (non-walk-in)		S = NEMA 1 R = NEMA 3R (NEMA 3R non-walk-in)	
Listing	U = UL 1008 listed X = No listing		U = UL 1008 listed X = No listing	

Key: DO = Drawout
FM = Fixed mounted
MPB = Magnum power breaker
MPS = Magnum power switch
MCB = Molded case breaker
MCS = Molded case switch

Product Description

For more information on "Transfer Switch Panels," refer to **Section 4** of this catalog "Advanced Residential Products."

Eaton's Automatic Transfer Switches are reliable, rugged, versatile and compact assemblies for transferring essential loads and electrical distribution systems from one power source to another.

Transfer switches can be supplied in separate enclosures for stand-alone applications or can be supplied as an integral component in the following equipment (see table below).

Product Type

Description	Section Reference
Magnum™ DS Switchgear	**19**
DSII Switchgear	**19**
Pow-R-Line™ Switchboards	**15**
Motor Control Centers	**18**
Panelboards	**14**

Application Description

A transfer switch is a critical component of any emergency or standby power system. When the normal (preferred) source of power is lost, a transfer switch quickly and safely shifts the load circuit from the normal source of power to the emergency (alternate) source of power. This permits critical loads to continue running with minimal or no outage. After the normal source of power has been restored, the retransfer process returns the load circuit to the normal power source.

Transfer switches are available with different operational modes including:

- Manual
- Non-automatic
- Automatic
- Bypass isolation
- Soft load
- Maintenance bypass

The power switching operation of transfer switches may be separated into the three key categories of:

- Open transition—break-before-make operation:
  - In-phase transfer transition
  - Delayed transition
- Closed transition—make-before-break operation
- Closed transition soft load—both sources are paralleled and can remain so indefinitely

The three basic components of a transfer switch are:

- Power switching device to shift the load circuits to and from the power source
- Transfer logic controller to monitor the condition of the power sources and provide the control signals to the power switching device
- Control power source to supply operational power to the controller and switching device

UL 1008 Endurance Testing

The importance of specifying a UL 1008 transfer switch can be seen in the table below. When specifying any UL 1008 transfer switch, you can be assured the switch has met and passed the following endurance testing.

UL 1008 Life Expectancy

Transfer switch applications typically require a plant exerciser once a week or once a month. The table below demonstrates the life expectancy operating the UL 1008 switch once a week for the life of the switch.

UL 1008 Endurance Testing

ATS Rating (Amperes)	Rate of Operation Per Minute	With Current	Without Current	Total
0–300	1	6000	—	6000
301–400	1	4000	—	4000
401–800	1	2000	1000	3000
801–1600	0.5	1500	1500	3000
1601–4000	0.25	1000	2000	3000

UL 1008 Life Expectancy

ATS Rating (Amperes)	Minimum Operations Per Year	Life Expectancy in Years With Current Applied	Life Expectancy in Years Without Current Applied
0–300	52	115	115
301–400	52	76	76
401–800	52	38	57
801–1600	52	28	57
1601–4000	52	19	57

Typical Applications

All Eaton transfer switches are designed to meet the requirements set forth by UL® 1008; however, all transfer switches are not created equal. You can be assured of safe and reliable operation from all types of transfer switches that Eaton offers.

Utility—Generator

Transfer switches are traditionally applied between a utility and a generator set for emergency and standby power systems.

Generator—Generator

Transfer switches are sometimes applied between two generator sets for prime power use, often in remote installations. In such applications, source power is periodically alternated between the generator sets to equally share run time.

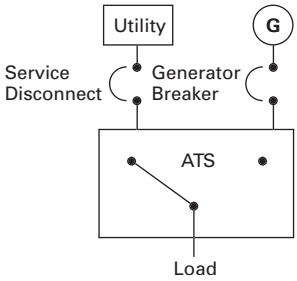
Service Entrance Rated Transfer Switches

Modifying the molded case switch in the transfer switch by adding trip units and optional ground fault, along with adding the service entrance option eliminates the need for separate upstream disconnect devices and their respective power interconnections. This means the automatic transfer switch (ATS) is installed directly at the point of service entrance, saving valuable space and cost.

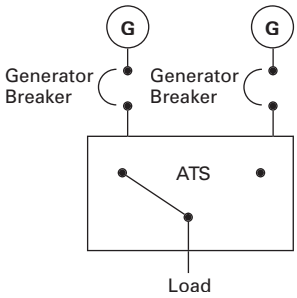
Built-In Protection

All Eaton molded case switches are "self protected," such that under extreme fault conditions, the switch will open before destroying itself. This feature allows Eaton to offer "Maintenance-Free Contacts" on the molded case transfer switch. The molded case switches have instantaneous magnetic trip units installed in each switch. These trips are not accessible once installed by the factory to eliminate field tapering. The trips are set to a minimum of 12 to 15 times the rated current of the molded case device, well above any coordination set points. This means they will not interfere with the normal operation of the distribution system and will only trip if something is very wrong.

Standard Application Utility—Generator

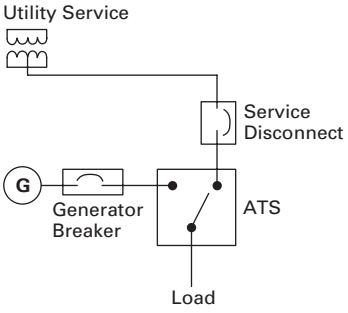


Standard Application Generator—Generator

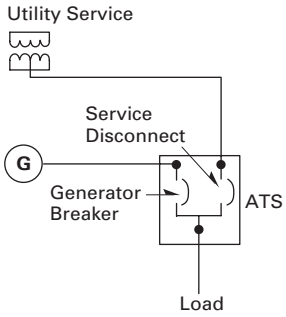


Service Entrance Rated Transfer Switches

Typical Transfer Switch Installation



Transfer Switch Installation Rated For Service Entrance

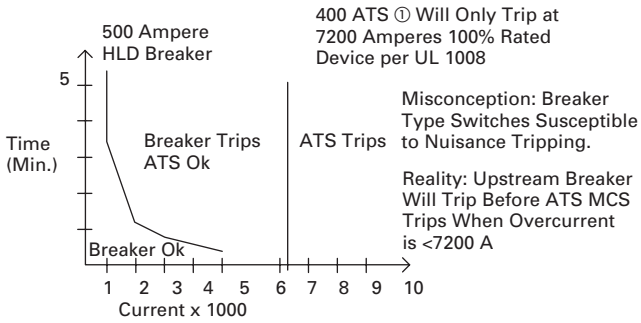


Built-In Protection

Example: 400 Ampere ATS With 500 Ampere T/M Breaker

400 FLA x 1.25 = 500 Ampere Breaker

Compare 400 Ampere ATS and 500 Ampere LD Breaker


500 Ampere HLD Breaker
400 ATS ① Will Only Trip at 7200 Amperes 100% Rated Device per UL 1008
5
Time (Min.)
Breaker Trips ATS Ok
ATS Trips
Misconception: Breaker Type Switches Susceptible to Nuisance Tripping.
Reality: Upstream Breaker Will Trip Before ATS MCS Trips When Overcurrent is <7200 A
Breaker Ok
1 2 3 4 5 6 7 8 9 10
Current x 1000

Note

① Magnetic Trip 12 x frame rating.

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Contactor-Based ATS with ATC-300 Controller

Contents

Description	*Page*
Automatic Open Transition, 40–1200A	
Features, Benefits and Functions	**9**
Catalog Number Selection	**10**
Technical Data and Specifications	**10**
Dimensions	**11**
Automatic Closed Transition, 40–1200A	**12**
Bypass Isolation Transfer Switches, 40–1200A, Dual Drawout	**16**
Bypass Isolation Transfer Switches, 40–1200A, Fixed Bypass	**21**

Automatic Open Transition, 40–1200A

Product Description

The automatic open transition contactor-based transfer switch is the most basic design that will provide a fully functioning automatic transfer switch.

The power switching operation of Eaton's contactor-based transfer switches may be separated into the following key categories of:

- Open in-phase transition—break-before-make operation utilizing an in-phase monitor for source synchronization
- Open delayed transition—break-before-make operation utilizing a programmable time delay (true neutral position)

The open in-phase transition utilizes a two-position mechanism and the open delayed transition utilizes a three-position mechanism. The mechanism used to operate the Eaton electrical contactor is a momentarily energized solenoid consisting of a stationary core and a moving core that is magnetically driven by an electrical coil.

The mechanism can be electrically and mechanically operated. The design is such that the mechanism is inherently interlocked so the device cannot be closed on the Source 1 and Source 2 at the same time under any circumstances. When switching from Source 1 to Source 2, or Source 2 to Source 1, the mechanism will only allow a break-before-make operation.

These contactor-based designs can be applied with the ATC-100 controller up to 400A. The ATC-300 controller can be applied for applications 40–1200A. Applications needing communication capability require the ATC-800 controller.

Application Description

An automatic open transition transfer switch may be used for those applications where emergency backup power is required, but a momentary loss of power is acceptable on the retransfer from emergency to normal.

Features, Benefits and Functions

Standard Features

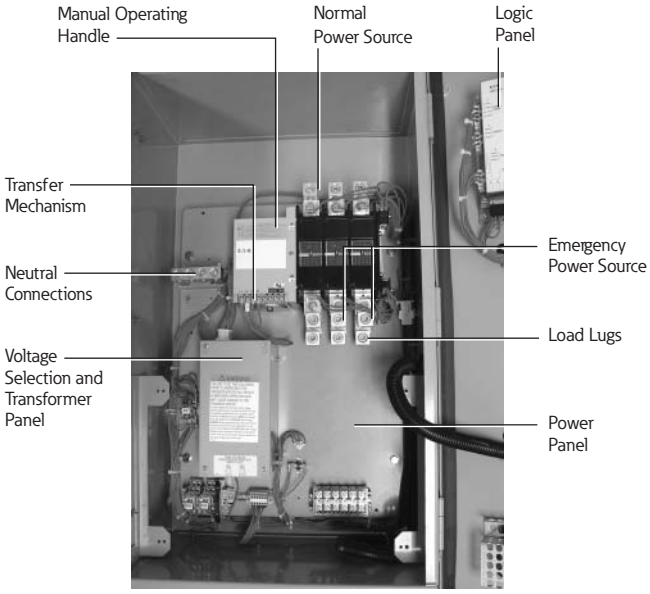
- Auxiliary relay contacts:
  - Source 1 present 2NO and 2NC
  - Source 2 present 2NO and 2NC
- Switch position indication contacts:
  - Source 1 position 1NO and 1NC
  - Source 2 position 1no and 1NC
- Source 1 and Source 2 sensing:
  - Undervoltage/ underfrequency
  - Overvoltage/ overfrequency
  - Three-phase rotation protection
  - Three-phase voltage unbalance
- Pretransfer signal contacts 1NO/1NC (with three-position mechanism)
- Go to emergency (Source 2)
- Seven field-programmable time delays
- LCD-based display for programming, system diagnostics and Help message display
- Mimic diagram with source available and connected LED indication
- Time-stamped history log
- System TEST pushbutton
- Programmable plant exerciser—OFF, daily, 7-, 14-, 28-day interval selectable run time 0–600 minutes no load/ load with fail-safe

Optional Features

- Available surge suppression device for power/controller, engine start circuit, phone and cable connections
- Space heater with thermostat
- Ammeter—load side
- Power quality metering
- Steel cover for controller
- Open in-phase transition or time delay neutral transition
- ATC-100 controller available
- ATC-800 controller available

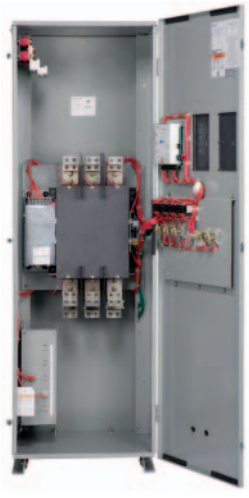
Commercial Design Highlights

- UL 1008 front access
- High withstand and closing ratings
- Compact design



Typical Contactor-Based ATS 100–400A

200A ATS with ATC-300 Controller

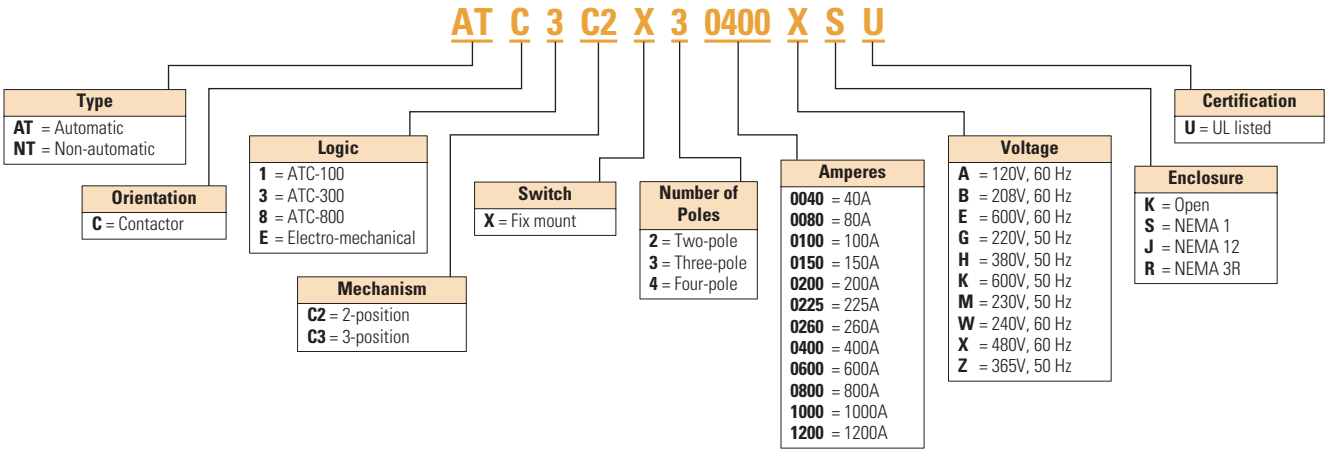


1200A ATS with ATC-300 Controller

16

Catalog Number Selection

Automatic Transfer Switch



Technical Data and Specifications

UL 1008 Withstand and Close-On Ratings (kA)

UL 1008 Ampere Rating	480V Any Breaker	480V Specific Breaker	600V Any Breaker	600V Specific Breaker	Rating When Used with Upstream Fuse			
					Rating (kA)	Test Voltage	Fuse Type	Maximum Fuse Amperes
40	10	30	10	22	100	480	RK5	200
80	10	30	10	22	100	480	RK5	200
100	10	30	10	22	100	480	RK5	200
150	10	30	22	35	100	600	RK5	400
200	10	30	22	35	100	600	RK5	400
225	30	50	50	65	200	600	RK5	600
260	30	50	50	65	200	600	RK5	600
400	30	50	50	65	200	600	RK5	600
600	50	65	50	65	200	600	L, R, J, T	1600
800	50	65	50	65	200	600	L, R, J, T	1600
1000	50	65	50	65	200	600	L, R, J, T	1600
1200	50	65	50	65	200	600	L, R, J, T	1600

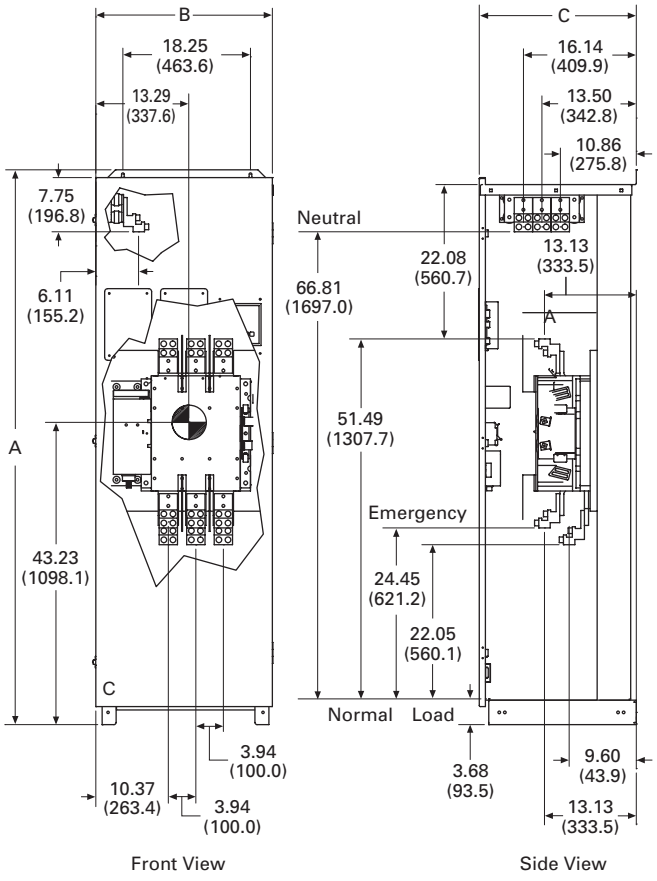
Dimensions

Approximate Dimensions in Inches (mm)

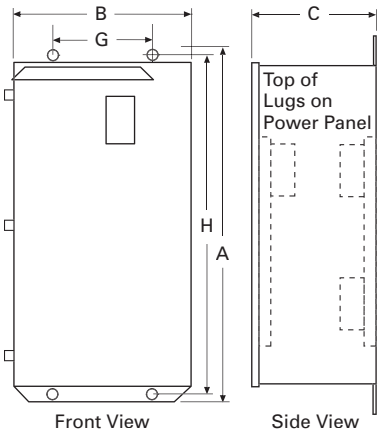
Contactor-Based Transfer Switch 40–1200A Open Transition

	Enclosure			Bolt Pattern		Standard Terminals		
Ampere Rating	A (Height)	B (Width)	C (Depth)	G (Horizontal)	H (Vertical)	Load Side, Normal and Standby Source	Neutral Connection	Weight in Lbs (kg)
40–100 at 480V ①	38.68 (982.5)	18.31 (465.1)	13.34 (338.8)	10.25 (260.4)	37.38 (949.5)	(1) #14–2/0	(1) #14–1/0	164 (74)
40–100 at 600V ①	38.68 (982.5)	18.31 (465.1)	13.34 (338.8)	10.25 (260.4)	37.38 (949.5)	(1) #14–2/0	(1) #14–1/0	164 (74)
150–200 at 480V ①	38.68 (982.5)	18.31 (465.1)	13.34 (338.8)	10.25 (260.4)	37.38 (949.5)	(1) #6–300 kcmil	(3) 1/0–250 kcmil	164 (74)
150–200 at 600V ①	48.74 (1238.0)	18.31 (465.1)	13.84 (351.5)	13.00 (330.2)	47.84 (1215.1)	(1) #6–300 kcmil	(3) 1/0–250 kcmil	260 (118)
225–400 at 480V ①	48.74 (1238.0)	18.31 (465.1)	13.84 (351.5)	13.00 (330.2)	47.84 (1215.1)	(2) #3 /0–250 kcmil	(6) 250–500 kcmil	260 (118)
225–1200 at 600V ①	79.41 (2017.0)	29.19 (741.4)	22.46 (570.5)	N/A	N/A	(4) 1/0–750 kcmil	(12) 1/0–750 kcmil	600 (272) three-pole
								650 (295) four-pole
600–1200 at 480V ②	79.41 (2017.0)	25.25 (641.4) three-pole	22.46 (570.5)	N/A	N/A	(4) 1/0–750 kcmil	(12) 1/0–750 kcmil	600 (272)

Automatic, Non-Automatic 600–1200A Outline



Automatic, Non-Automatic Up to 400A—Wallmount



Notes

① Wallmount.

② Floor standing—height dimension includes the bottom bracket.

Contactor-Based ATS with ATC-800 Controller

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Bypass Isolation Transfer Switches, 40–1200A, Fixed Bypass	**21**

Automatic Closed Transition, 40–1200A

Product Description

Eaton's closed transition contactor-based automatic transfer switch (CTC8) is designed to avoid intentional interruption of power when both sources of power are available by momentarily paralleling both sources.

The ATC-800 is a comprehensive, multi-function, microprocessor-based controller, offering extensive monitoring, status reporting and transfer control operation.

The make-before-break contact sequence coupled with Eaton's ATC-800 provides a transfer switch that is useful in critical standby power applications available from 40–1200A.

Application Description

A transfer switch designed for closed transition has make-before-break contacts that require the normal and alternate sources to be synchronized. The source contacts on Eaton's CTC8 will parallel for 100 ms or less. The ATC-800 provides all-phase undervoltage, underfrequency, and overvoltage and overfrequency protection as a standard. Consult with the local utility company for permission and to verify the protection requirements as each utility may have different rules regarding closed transition applications. Protective relays may be available as an option upon request.

Closed transition controls

The CTC8 accomplishes the closed transition transfer by monitoring the voltage and frequency set point conditions of both power sources. Once the set point conditions are met, the ATC-800 controller will start the closed transition synchronization timer (TSCT). The TSCT is adjustable from 1–60 minutes in duration. This duration is the time during which the ATC-800 controller will monitor the phase angles to anticipate when they will be within 8 electrical degrees. The closed transition scheme is anticipatory, allowing the close contacts signal to be initiated before the sources are exactly in phase. If the TSCT times out and the transfer switch has not reached synchronization, the transfer switch will remain connected to the current power source and a failure to transfer alarm will be displayed.

The transfer switch can also be equipped with an optional open transition transfer method for situations where synchronization is not possible, but a transfer is required. One of the following transition features can be selected:

- Closed transition only
- Closed transition with default to load voltage decay
- Closed transition with default to time delay neutral

Features, Benefits and Functions

Standard Features

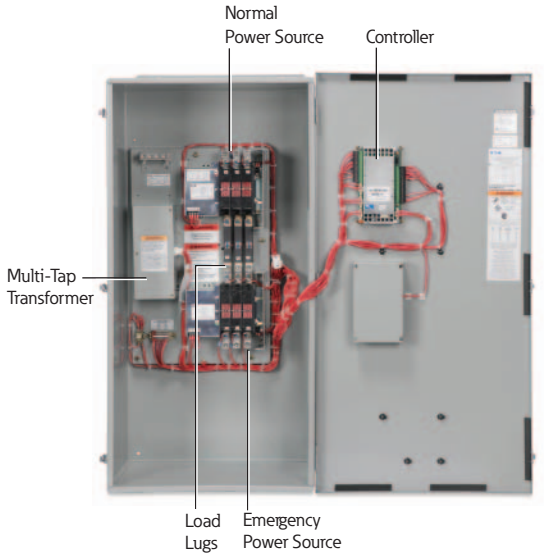
- Auxiliary relay contacts:
  - Source 1 present 1NO and 1NC
  - Source 2 present 1NO and 1NC
- Switch position indication contacts:
  - Source 1 position 1NO and 1NC
  - Source 2 position 1NO and 1NC
- Source 1 and Source 2 sensing:
  - Undervoltage/ underfrequency
  - Overvoltage/ overfrequency
- Go to emergency (Source 2)
- Seven field-programmable time delays
- LCD-based display for programming, system diagnostics and Help message display
- Mimic diagram with source available and connected LED indication
- Time-stamped history log
- System TEST pushbutton
- Programmable plant exerciser—OFF, daily, 7-day interval selectable run time 0–600 minutes no load/load with fail-safe
- Multi-Tap transformer

Optional Features

- Available surge suppression device for power/controller, engine start circuit, phone and cable connections
- Space heater with thermostat
- Ammeter—load side
- Power quality metering
- Steel cover for controller
- Open in-phase transition or time delay neutral transition
- ATC-800 controller available
- Three-phase rotation protection
- Three-phase voltage unbalance
- Pretransfer signal contacts 1NO/1NC (with three-position mechanism)

Commercial Design Highlights

- UL 1008 front access
- High withstand and closing ratings
- Compact design



Typical Contactor-Based ATC-800 Controller

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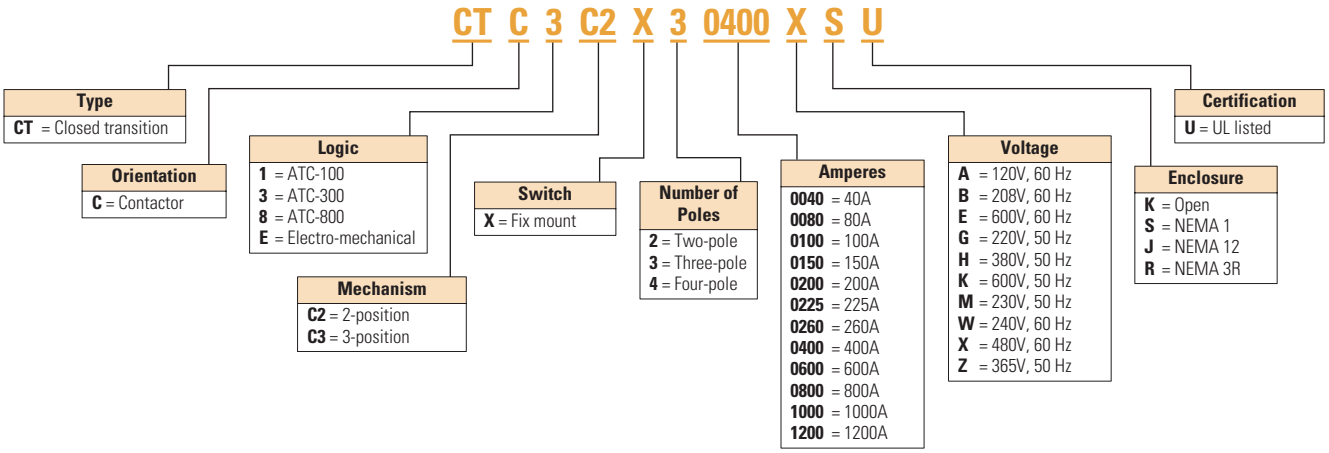
Catalog Number Selection

Automatic Transfer Switch



Technical Data and Specifications

UL 1008 Withstand and Close-On Ratings (kA)

UL 1008 Ampere Rating	480V Any Breaker	480V Specific Breaker	600V Any Breaker	600V Specific Breaker	Rating When Used with Upstream Fuse			
					Rating (kA)	Test Voltage	Fuse Type	Maximum Fuse Amperes
40	10	30	10	22	100	480	RK5	200
80	10	30	10	22	100	480	RK5	200
100	10	30	10	22	100	480	RK5	200
150	10	30	22	35	100	600	RK5	400
200	10	30	22	35	100	600	RK5	400
225	30	50	50	65	200	600	RK5	600
260	30	50	50	65	200	600	RK5	600
400	30	50	50	65	200	600	RK5	600
600	50	65	50	65	200	600	L, R, J, T	1600
800	50	65	50	65	200	600	L, R, J, T	1600
1000	50	65	50	65	200	600	L, R, J, T	1600
1200	50	65	50	65	200	600	L, R, J, T	1600

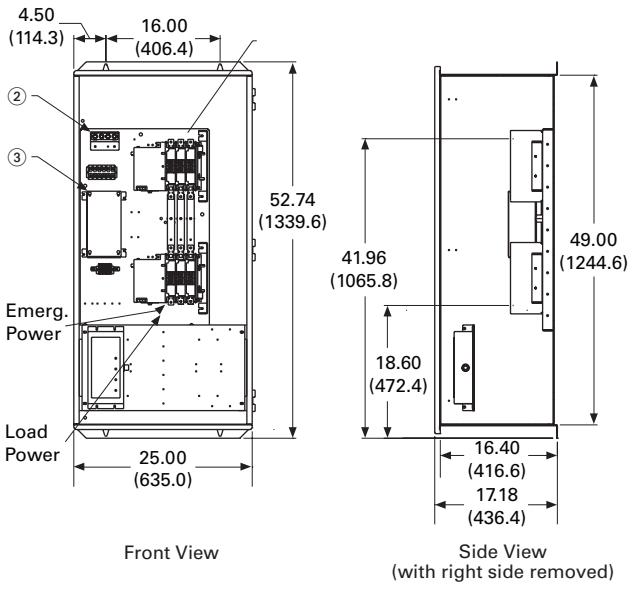
Dimensions

Approximate Dimensions in Inches (mm)

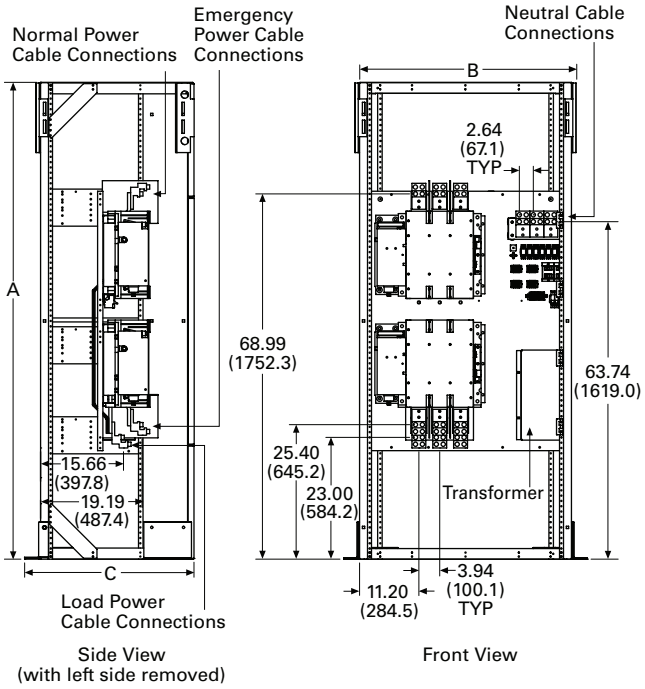
Contactor-Based Transfer Switch 40–1200A Closed Transition

	Enclosure			Bolt Pattern		Standard Terminals		
Ampere Rating	A (Height)	B (Width)	C (Depth)	G (Horizontal)	H (Vertical)	Load Side, Normal and Standby Source	Neutral Connection	Weight in Lbs (kg)
40–100 at 480V	52.74 (1339.6)	25.00 (635.0)	17.18 (436.4)	10.25 (260.4)	37.38 (949.5)	(1) #14–2/0	(3) #14–2/0	190 (86)
40–100 at 600V	52.74 (1339.6)	25.00 (635.0)	17.18 (436.4)	10.25 (260.4)	37.38 (949.5)	(1) #6–250 kcmil	(3) #14–1/0	210 (95)
150–200 at 480V	52.74 (1339.6)	25.00 (635.0)	17.18 (436.4)	10.25 (260.4)	37.38 (949.5)	(1) #6–250 kcmil	(3) 1/0–250 kcmil	210 (95)
150–200 at 600V ①	90.00 (2286.0)	46.00 (1168.4)	32.00 (812.8)	13.00 (330.2)	47.84 (1215.1)	(2) 3/0–250 kcmil	(6) 250–500 kcmil	800 (363)
225–400 at 480V	71.02 (1803.9)	33.61 (853.7)	14.72 (373.9)	13.00 (330.2)	47.84 (1215.1)	(2) 3/0–250 kcmil	(6) 250–500 kcmil	420 (191)
225–1200 at 600V ①	90.00 (2286.0)	46.00 (1168.4)	32.00 (812.8)	N/A	N/A	(4) 1/0–750 cu/al	(12) 1/0–750 kcmil	800 (363)
600–1200 at 480V ①	90.00 (2286.0)	46.00 (1168.4)	32.00 (812.8)	N/A	N/A	(4) 1/0–750 cu/al	(12) 1/0–750 kcmil	800 (363)

Automatic Up to 400A Wallmount



Automatic 600–1200A—Wallmount



Notes

① For NEMA 3R, add __-inch to depth.

② For switched neutral applications, connect to terminals marked 'NN', 'EN' and 'LN'. Neutral assembly will not be provided.

③ Transformer pack is not included with 240/120V, single-phase or 208/120V, three-phase systems.

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Bypass Isolation Transfer Switch

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Bypass Isolation Transfer Switches, 40–1200A, Fixed Bypass	21

Bypass Isolation Transfer Switches, 40–1200A, Dual Drawout

Product Description

A bypass isolation transfer switch may be used to provide emergency power to life safety and other critical loads where maintenance of the main transfer switch, without interruption of power to the load, is either desirable or required.

Application Description

Eaton's Automatic Transfer Switch is designed to provide unmatched performance, reliability and versatility for critical standby power applications. The switches can be equipped with the ATC-300 or ATC-800 controllers to match your application needs.

Features

Industrial Design Highlights

- Front access is a standard feature on all ratings
- Entry:
  - Top, bottom or both
  - Isolated compartments
- Improved safety:
  - Isolated compartments with barriers
  - Single motion rack-out with doors closed
  - Ability to test power switching elements during drawout process
  - Dual ATS capability—bypass contactor can be controlled by the ATS controller in the bypass mode of operation
- Installation flexibility:
  - Field entry/exit locations can be modified in the field
  - Interchangeable drawout contactors
- Field-selectable multi-tap transformer panel permits operation on a wide range of system voltages
- Dual drawout

Standard Features

- Drawout cassette design on both ATS and bypass
- No service interruption in bypass to the same source
- Source available contacts:
  - Source 1 present 2NO and 2NC
  - Source 2 present 2NO and 2NC
- Switch position contacts:
  - Source 1 position 1NO and 1NC
  - Source 2 position 1NO and 1NC
- Source 1 and Source 2 sensing:
  - Undervoltage/underfrequency
  - Overvoltage/overfrequency
  - Three-phase rotation protection (ATC-300 only)
  - Three-phase voltage unbalance/loss (ATC-300 only)
- Pretransfer signal contacts 1NO and 1NC (open transition only)
- Go to Source 2 (EMERGENCY)
- Field-programmable time delays:
  - Time delay engine start: 0–1200 seconds
  - Time delay normal to emergency: 0–1800 seconds
  - Time delay emergency to normal: 0–1800 seconds
  - Time delay engine cooldown: 0–1800 seconds
  - Time delay emergency failure: 0–6 seconds
- LCD-based display for programming, system diagnostics and Help menu display
- Mimic diagram with source available and connected LED indication
- Time-stamped history log
- System TEST pushbutton
- Programmable plant exerciser—OFF, daily, 7-, 14-, 28-day interval selectable run time 0–600 minutes no load/load with fail-safe

Optional Features

- Available surge protection device (SPD) for power/controller, engine start circuit, phone and cable connections
- Automatic transfer operation with selectable (via programming) non-automatic or automatic retransfer with fail-safe
- Space heater with thermostat
- Digital multi-function power quality metering
- Stainless steel cover for controller
- Load sequencing contacts

Bypass Isolation Switch Components

Front Access
Front access is a standard feature. Source 1 (NORMAL) Source and Load connections are set up as standard top entry and Source 2 (EMERGENCY) Source connections as bottom entry. These connections are located in their own separate compartments. These connections can be relocated in the field if necessary.

Multi-Tap Transformer
The industry-exclusive multi-tap system voltage selector allows the transfer switch to be applied on most system voltages by proper insertion of the selector plug.

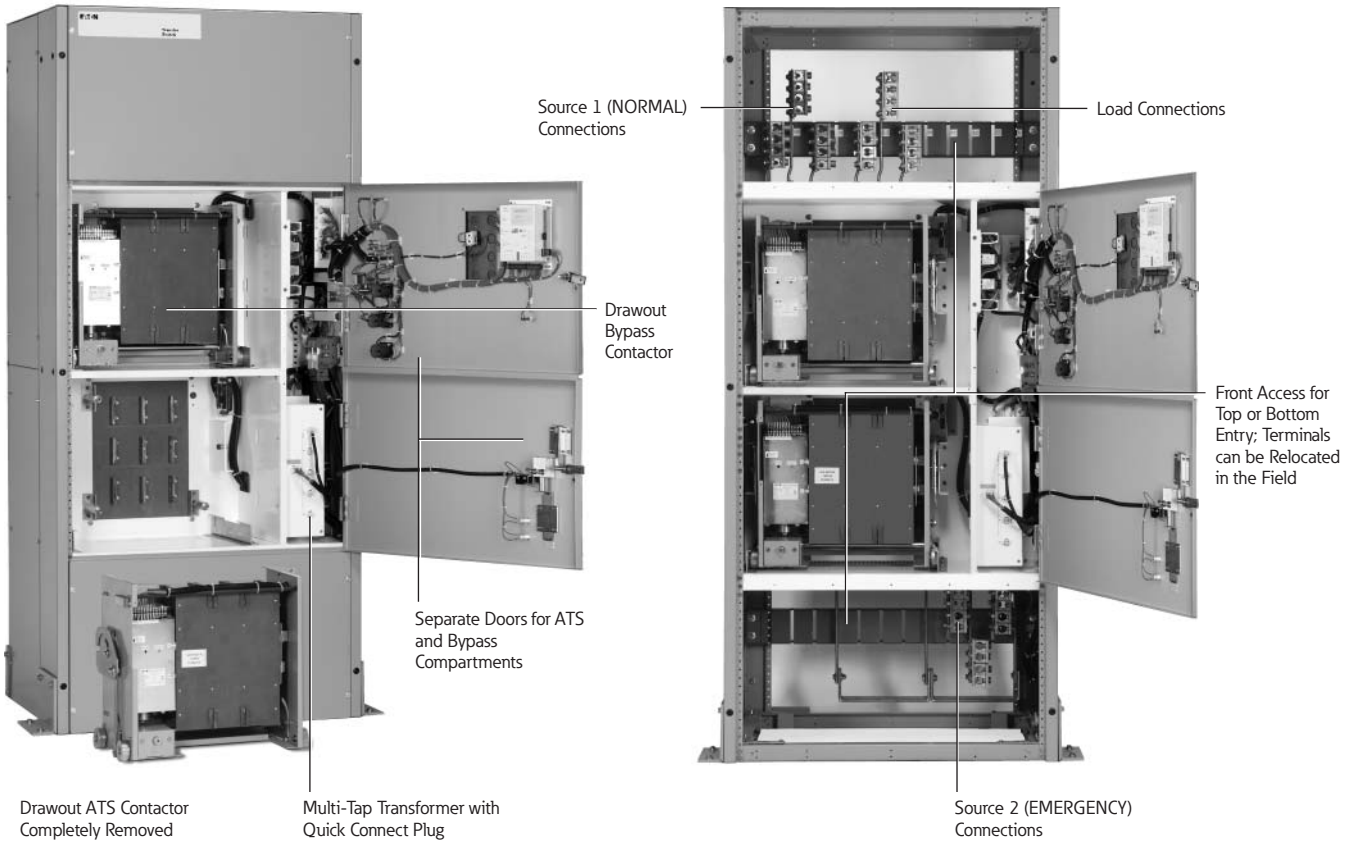
Drawout Contactors
The ATS and the bypass drawout cassette power contactor designs are identical and interchangeable. This standard feature allows the user the ability to withdraw, maintain or swap contactor assemblies, providing redundancy of ATS and bypass functions from one contactor assembly to the other.

Improved Safety
The unique Eaton design includes separation between control and power components. The ATS and bypass isolation contactors are mounted in separate compartments with protective barriers between them. This design prevents the possibility of contact with the rear-mounted power connections to the contactors. In addition, the top and bottom entry have separate compartment doors.

Ease of Maintenance
Transfer to the bypass power contactor is easily initiated and controlled via door-mounted controls. Once the transfer to the bypass contactor is complete, the ATS contactor is easily racked out with the compartment door closed. The ATS contactor may then be tested in the racked out position.

Ease of Transfer
The Eaton design allows the operator to make a quick and simple transfer from the ATS power contactor to the bypass contactor by initiating the electrically operated transfer via a two-position switch. Door-mounted indicating lights confirm that a successful transfer has taken place.

Dual ATS Capability
The controller on conventional bypass isolation switches only controls the ATS contactor. The Eaton design allows the switch controller to remain active in both the ATS and bypass modes, thus providing control to either contactor. This ability of the controller to remain active and control the bypass isolation contactor provides "N+1" redundancy of a second fully functioning ATS, a feature unique to Eaton.


Source 1 (NORMAL) Connections
Load Connections
Drawout Bypass Contactor
Front Access for Top or Bottom Entry; Terminals can be Relocated in the Field
Separate Doors for ATS and Bypass Compartments
Drawout ATS Contactor Completely Removed
Multi-Tap Transformer with Quick Connect Plug
Source 2 (EMERGENCY) Connections

Bypass Isolation Switch Components

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Standards and Certifications

- UL® 1008 listed
- CSA® C22.2 No. 178 certified

Listed

Catalog Number Selection

Automatic Bypass Isolation Contactor-Based Transfer Switch

BI C 3 C3 E 3 1200 W S U

Type
BI = Bypass isolation open transition
CB = Bypass isolation closed transition

Orientation
C = Contactor

Logic
3 = ATC-300
8 = ATC-800 (closed transition)
I = ATC-800 (open transition)

Frame
C3 = 3-position mechanism

Mounting
E = Drawout
X = Fixed

Number of Poles
2 = Two-pole
3 = Three-pole
4 = Four-pole

Amperes
0100 = 100A
0150 = 150A
0225 = 225A
0260 = 260A
0400 = 400A
0600 = 600A
0800 = 800A
1000 = 1000A
1200 = 1200A

Voltage
B = 208V, 60 Hz
E = 600V, 60 Hz
G = 220V, 50 Hz
H = 380V, 50 Hz
K = 600V, 50 Hz
M = 230V, 50 Hz
N = 401V, 50 Hz
O = 415V, 50 Hz
W = 240V, 60 Hz
X = 480V, 60 Hz
Z = 365V, 50 Hz

Enclosure
S = NEMA 1
R = NEMA 3R

Certification
U = UL 1008 listed
R = UL recognized

Technical Data and Specifications

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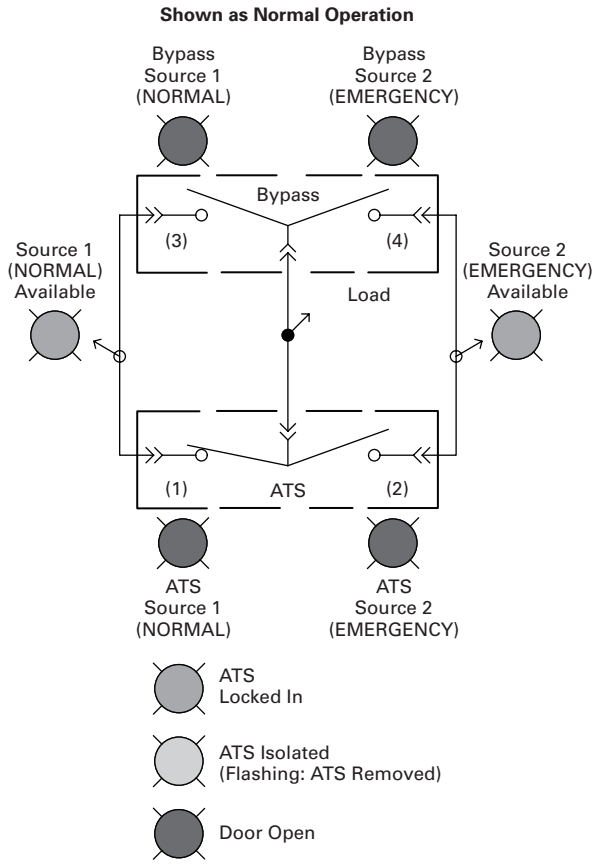
UL 1008 Withstand and Close-On Ratings (kA)

UL 1008 Ampere Rating	480V Any Breaker	480V Specific Breaker	600V Any Breaker	600V Specific Breaker	Rating When Used with Upstream Fuse Rating (kA)	Test Voltage	Fuse Type	Maximum Fuse Amperes
40	10	30	10	22	100	480	RK5	200
80	10	30	10	22	100	480	RK5	200
100	10	30	10	22	100	480	RK5	200
150	10	30	22	35	100	600	RK5	400
200	10	30	22	35	100	600	RK5	400
225	30	50	50	65	200	600	RK5	600
260	30	50	50	65	200	600	RK5	600
400	30	50	50	65	200	600	RK5	600
600	50	65	50	65	200	600	L, R, J, T	1600
800	50	65	50	65	200	600	L, R, J, T	1600
1000	50	65	50	65	200	600	L, R, J, T	1600
1200	50	65	50	65	200	600	L, R, J, T	1600

Wiring Diagram

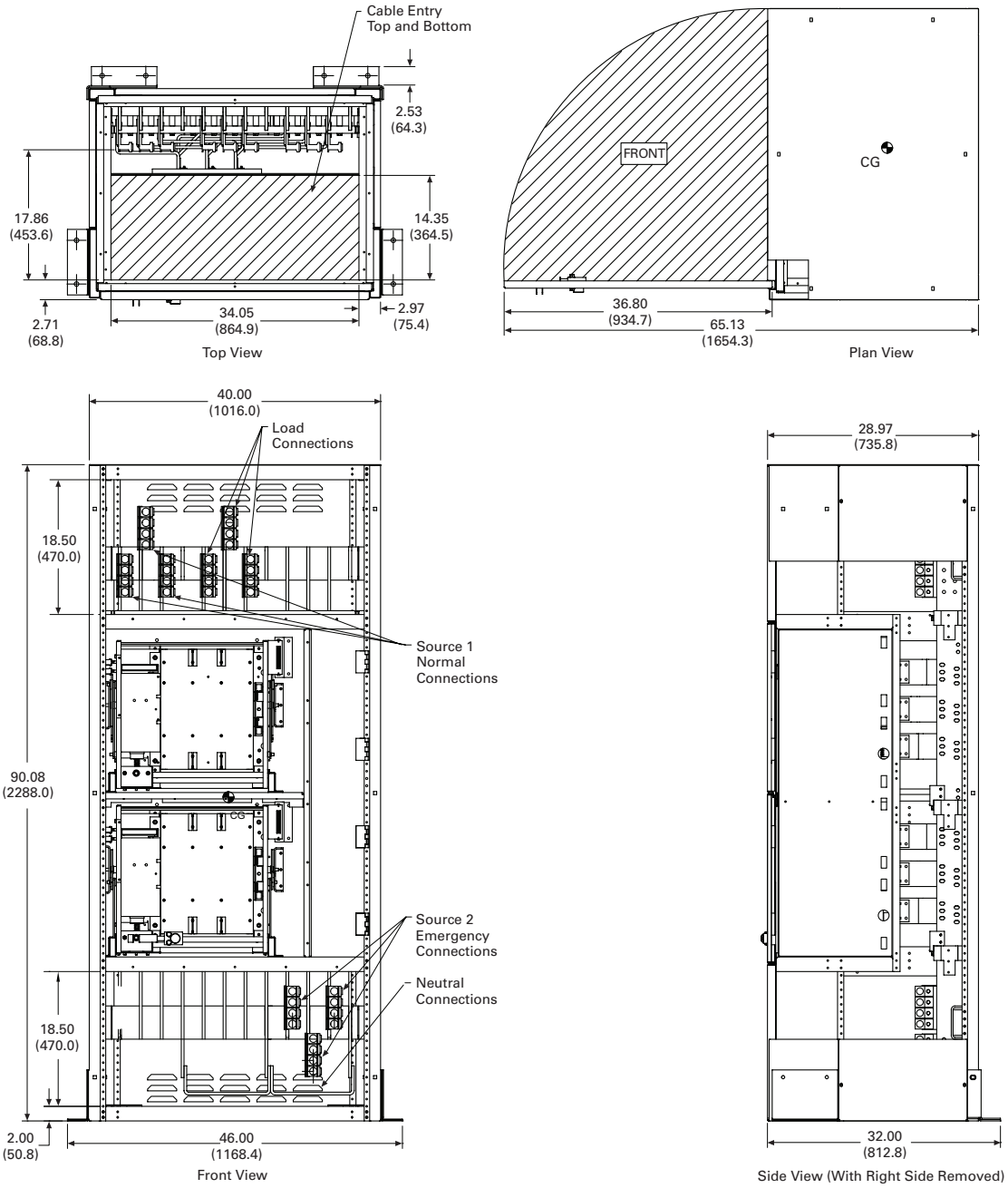
Bypass Isolation



Dimensions

Approximate Dimensions in Inches (mm)

Bypass Isolation Contactor-Based Design NEMA 1 and NEMA 3R



Contactor-Based Transfer Switch 100–1200A

Switch Ampere Rating	Enclosure Height	Width	Depth	Standard Terminals Line Side (Normal	Load	Neutral	Weight in Lbs (kg)
100–1200	90.00 (2286.0)	46.00 (1168.4)	32.00 (812.8)	(4) #1/0–750 Cu/Al	(4) #1/0–750 Cu/Al	(3) #14–2/0	1800 (817) NEMA 1
100–1200 ①	90.00 (2286.0)	46.00 (1168.4)	47.50 (1026.5)	(4) #1/0–750 Cu/Al	(4) #1/0–750 Cu/Al	(3) #14–2/0	1850 (840) NEMA 3R

Note

① NEMA 3R dimensions.

Bypass Isolation Transfer Switch

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Bypass Isolation Transfer Switches, 40–1200A, Fixed Bypass

Product Description

A bypass isolation transfer switch may be used to provide emergency power to life safety and other critical loads where maintenance of the main transfer switch, without interruption of power to the load, is either desirable or required.

Application Description

Eaton's Automatic Transfer Switch is designed to provide unmatched performance, reliability and versatility for critical standby power applications. The switches can be equipped with the ATC-300 or ATC-800 controllers to match your application needs.

Features

Industrial Design Highlights

- Front access is a standard feature on all ratings
- Entry:
  - Top, bottom or both
  - Isolated compartments
- Improved safety:
  - Isolated compartments with barriers
  - Single motion rack-out with doors closed
  - Ability to test power switching elements during drawout process
  - Dual ATS capability—bypass contactor can be controlled by the ATS controller in the bypass mode of operation
- Installation flexibility:
  - Field entry/exit locations can be modified in the field
  - Interchangeable drawout contactors
- Field-selectable multi-tap transformer panel permits operation on a wide range of system voltages
- Fixed bypass

Standard Features

- Drawout cassette design on both ATS and bypass
- No service interruption in bypass to the same source
- Source available contacts:
  - Source 1 present 2NO and 2NC
  - Source 2 present 2NO and 2NC
- Switch position contacts:
  - Source 1 position 1NO and 1NC
  - Source 2 position 1NO and 1NC
- Source 1 and Source 2 sensing:
  - Undervoltage/underfrequency
  - Overvoltage/overfrequency
  - Three-phase rotation protection (ATC-300 only)
  - Three-phase voltage unbalance/loss (ATC-300 only)
- Pretransfer signal contacts 1NO and 1NC (open transition only)
- Go to Source 2 (EMERGENCY)
- Field-programmable time delays:
  - Time delay engine start: 0–1200 seconds
  - Time delay normal to emergency: 0–1800 seconds
  - Time delay emergency to normal: 0–1800 seconds
  - Time delay engine cooldown: 0–1800 seconds
  - Time delay emergency failure: 0–6 seconds
- LCD-based display for programming, system diagnostics and Help menu display
- Mimic diagram with source available and connected LED indication
- Time-stamped history log
- System TEST pushbutton

Programmable plant exerciser—OFF, daily, 7-, 14-, 28-day interval selectable run time 0–600 minutes no load/load with fail-safe (ATC-300 only)

Optional Features

- Available surge protection device (SPD) for power/controller, engine start circuit, phone and cable connections
- Automatic transfer operation with selectable (via programming) non-automatic or automatic retransfer with fail-safe
- Space heater with thermostat
- Digital multi-function power quality metering
- Stainless steel cover for controller
- Load sequencing contacts
- Dual ATS

Bypass Isolation Switch Components

Front Access
Front access is a standard feature. Source 1 (NORMAL), Source 2 (EMERGENCY) and Load connections are set up as bottom entry. These connections are located in their own separate compartments.

Multi-Tap Transformer
The industry-exclusive Multi-Tap system voltage selector allows the transfer switch to be applied on most system voltages by proper insertion of the selector plug.

Drawout ATS and Fixed-Mounted Bypass
The ATS is designed as a drawout with the contactor mounted in a cassette with wheels. This allows the user the ability to withdraw, maintain, inspect and re-insert the ATS.

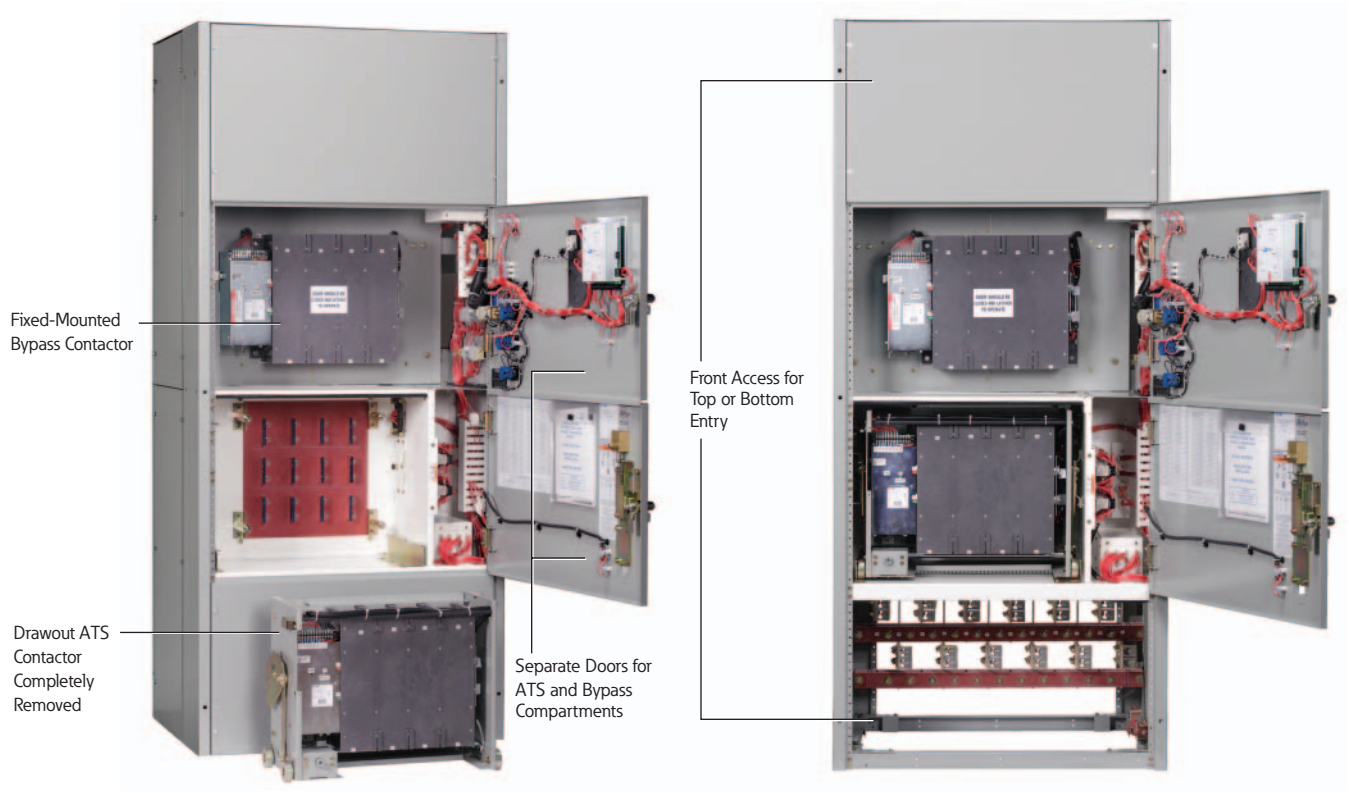
The bypass unit is designed as a fixed-mounted design in its own separate compartment.

Improved Safety
The unique Eaton design includes separation between control and power components. The ATS and bypass isolation contactors are mounted in separate compartments with protective barriers between them. This design prevents the possibility of contact with the rear-mounted power connections to the contactors. In addition, the top and bottom entry have separate compartment doors.

Ease of Maintenance
Transfer to the bypass power contactor is easily initiated and controlled via door-mounted controls. Once the transfer to the bypass contactor is complete, the ATS contactor is easily racked out with the compartment door closed. The ATS contactor may then be tested in the isolated position.

Ease of Transfer
The Eaton design allows the operator to make a quick and simple transfer from the ATS power contactor to the bypass contactor by initiating the electrically operated transfer via a two-position switch. Door-mounted indicating lights confirm that a successful transfer has taken place.

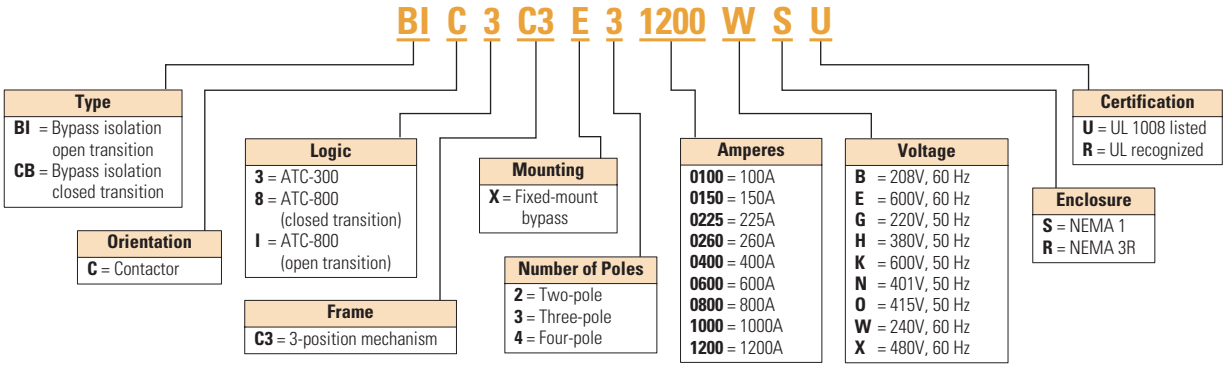
Optional Dual ATS Capability
The controller on conventional bypass isolation switches only controls the ATS contactor. The Eaton design allows the switch controller to remain active in both the ATS and bypass modes, thus providing control to either contactor. This ability of the controller to remain active and control the bypass isolation contactor provides "N+1" redundancy of a second fully functioning ATS, a feature unique to Eaton.


Fixed-Mounted Bypass Contactor
Drawout ATS Contactor Completely Removed
Separate Doors for ATS and Bypass Compartments
Front Access for Top or Bottom Entry

Bypass Isolation—Fixed Bypass Components

Catalog Number Selection

Automatic Bypass Isolation Contactor-Based Transfer Switch



Technical Data and Specifications

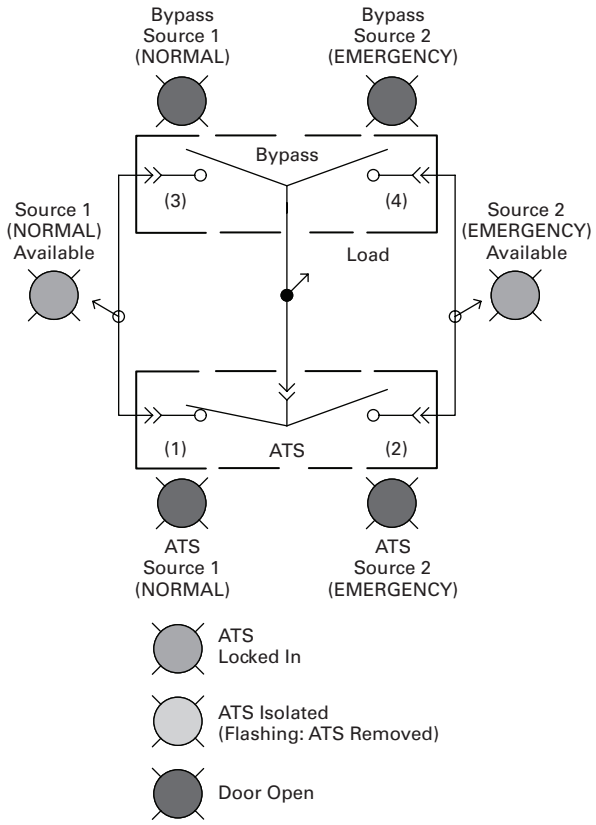
UL 1008 Withstand and Close-On Ratings (kA)

UL 1008 Ampere Rating	480V Any Breaker	480V Specific Breaker	600V Any Breaker	600V Specific Breaker	Rating When Used with Upstream Fuse			
					Rating (kA)	Test Voltage	Fuse Type	Maximum Fuse Amperes
40	10	30	10	22	100	480	RK5	200
80	10	30	10	22	100	480	RK5	200
100	10	30	10	22	100	480	RK5	200
150	10	30	22	35	100	600	RK5	400
200	10	30	22	35	100	600	RK5	400
225	30	50	50	65	200	600	RK5	600
260	30	50	50	65	200	600	RK5	600
400	30	50	50	65	200	600	RK5	600
600	50	65	50	65	200	600	L, R, J, T	1600
800	50	65	50	65	200	600	L, R, J, T	1600
1000	50	65	50	65	200	600	L, R, J, T	1600
1200	50	65	50	65	200	600	L, R, J, T	1600

Wiring Diagram

Bypass Isolation

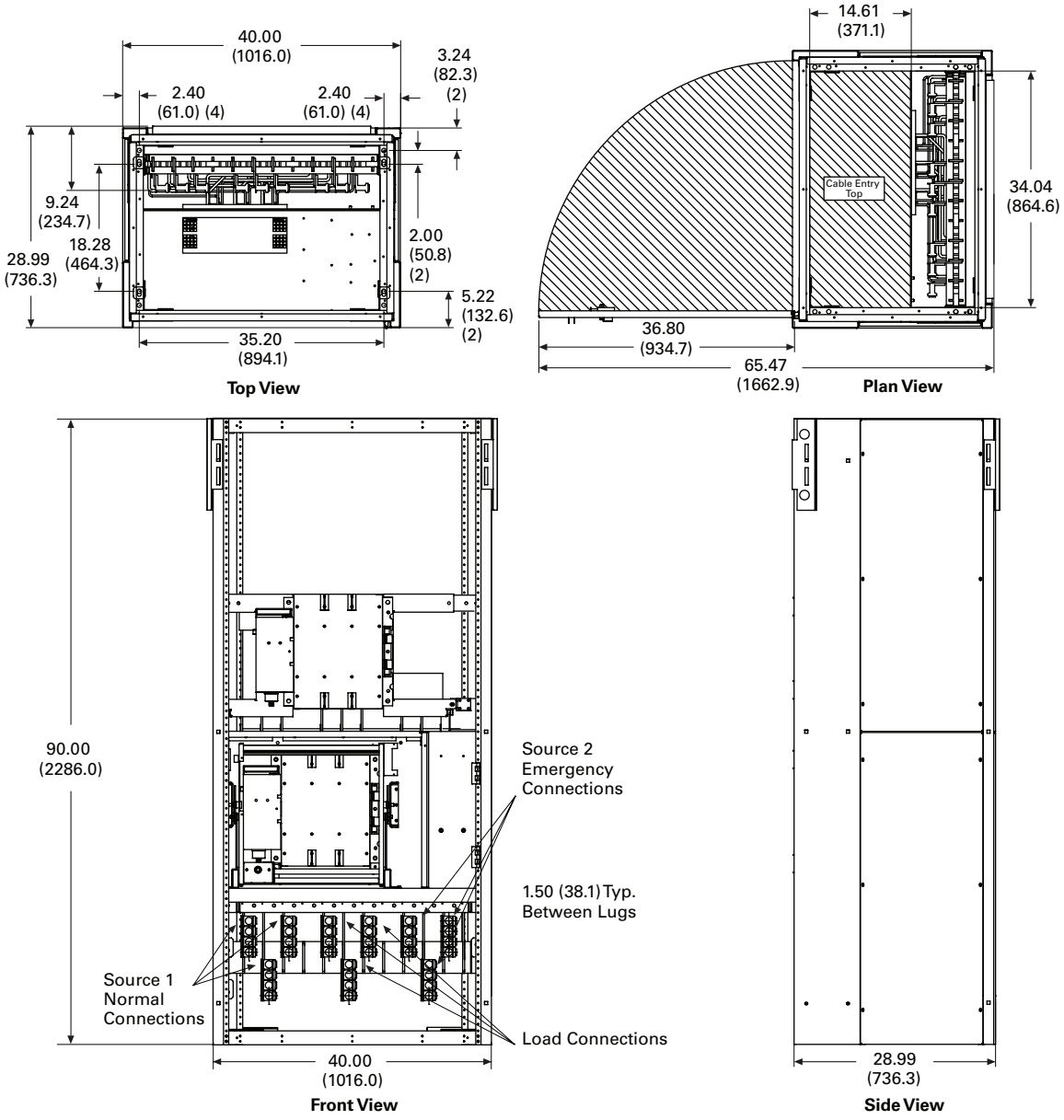
Shown as Normal Operation



Dimensions

Approximate Dimensions in Inches (mm)

Bypass Isolation Contactor-Based Design NEMA 1 and NEMA 3R



Contactor-Based Transfer Switch 100–1200A

Switch Ampere Rating	Enclosure Height	Width	Depth	Standard Terminals Line Side (Normal	Load	Neutral	Weight in Lbs (kg)
100–200	90.00 (2286.0)	40.00 (1016.0)	28.99 (736.3)	(1) #6–250 Cu/Al	(1) #6–250 Cu/Al	(3) #6–250 Cu/Al	1750 (795) NEMA 1
100–200	90.00 (2286.0)	40.00 (1016.0)	44.47 (1129.5)	(1) #6–250 Cu/Al	(1) #6–250 Cu/Al	(3) #6–250 Cu/Al	1850 (840) NEMA 3R
400–1200 ①	90.00 (2286.0)	40.00 (1016.0)	28.99 (736.3)	(2) 3/0–750 Cu/Al	(2) 3/0–750 Cu/Al	(12) 3/0–750 Cu/Al	1800 (817) NEMA 1
400–1200 ①	90.00 (2286.0)	40.00 (1016.0)	44.47 (1129.5)	(2) 3/0–750 Cu/Al	(2) 3/0–750 Cu/Al	(12) 3/0–750 Cu/Al	1850 (840) NEMA 3R

Notes

① NEMA 3R dimensions.

② If seismic mounting brackets are required, then the width will be 46.00 (1168.4).

Manual Wallmount Transfer Switch

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Molded Case Switches—Manual Wallmount

Description

Eaton's wallmount manually operated transfer switches are designed for a variety of standby power applications for critical loads. In the event of a primary power source interruption, the user can manually transfer the load circuits to the standby power source. Once primary power has been restored, the user can manually transfer the load circuits back to the primary power source.

Application Description

Manual transfer switches cover applications ranging from 30 to 1000A through 600 Vac for standard manual configurations and open transition.

Manual transfer switches may be applied for those application where a manually initiated and manually operated transfer is suitable. The front door of the switch must be opened to operate the manual handle. The design comes standard with a deadfront design, allowing safe manual transfer under load. Should an application require a service entrance rating, then a non-automatic or automatic design needs to be selected.

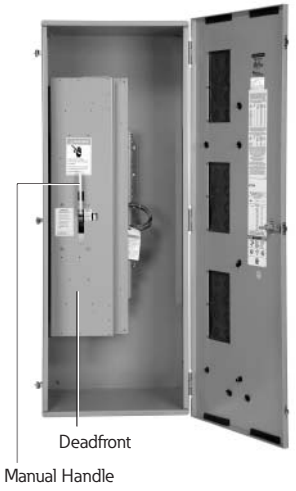
Features and Benefits

Features

- Molded case switch power contact assemblies
- Positive mechanical interlocking
- Permanently affixed manual operating handle

Benefits

- High withstand, totally enclosed for maximum arc suppression and isolation during power transfer
- Optional trip units offer system overcurrent protection
- Prevents the paralleling of two sources of power
- Permits safe and convenient manual transfer of power



Manual Switch with Door Open—Manually Initiated and Manually Operated

Note: If a service entrance rating is required, then a non-automatic type switch must be selected. Service entrance ratings are not available on a manual transfer switch.

Manual Switch with Door Closed—Must Open Door to Engage the Manual Handle

Manual Transfer Switch Shown Without Deadfront

Standards and Certifications

- Complies with UL 1008 and UL 489 standards
- IBC seismic qualified
- Meets American Bureau of Shipping (ABS) approval

Catalog Number Selection

Manual Breaker-Based Transfer Switch

MT H X MD C 2 0100 E S U

Type	Orientation	Logic	Frame	Number of Poles	Mounting (Fixed)	Amperes	Voltage	Enclosure	Certification
MT = Manual	**H** = Horizontal ①	**X** = No logic	**Molded case device**	**2** = Two-pole	**A** = FM, N (MCS), E (MCS)	**0030** = 30A	**E** = 600V, 60 Hz	**K** = Open	**U** = UL 1008 listed
	V = Vertical		**FD** = 30–150A	**3** = Three-pole	**B** = FM, N (MCB), E (MCB)	**0070** = 70A		**S** = NEMA 1	
			KD = 150–300A	**4** = Four-pole	**C** = FM, N (MCB), E (MCS)	**0100** = 100A		**J** = NEMA 12	
			LD = 400–600A		**D** = FM, N (MCS), E (MCB)	**0150** = 150A		**R** = NEMA 3R	
			MD = 600–800A			**0225** = 225A		**L** = NEMA 4	
			ND = 800–1000A			**0300** = 300A		**D** = NEMA 4X	
						0400 = 400A			
						0600 = 600A			
						0800 = 800A			
						1000 = 1000A			

Note

① Horizontal is available only on ratings 150A or less.

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Technical Data and Specifications

Wallmount Transfer Switch Standard Terminal Data for Power Cable Connections ①

Switch Ampere Rating	Breaker Frame	Line Side (Normal and Standby Source)	Load Connection	Neutral Connection
30–100	HFD	(1) #14–1/0	(1) #14–1/0	(3) #14–1/0
150–225	HFD	(1) #6–300	(1) #6–300	(3) #4–300
225–300	HKD	(1) #3–350	(1) #6–350	(3) #4–350
400	HLD	(1) 4/0–600	(2) #1–500	(6) 250–350
600	HLD	(1) 3/0–350	(2) #1–500	(6) 250–350
600	HMDL	(2) #1–500	(2) #1–500	(12) 4/0–500
600 (four-pole)	NB	(3) 3/0–400	(3) 3/0–400	(3) 3/0–400
800	HMDL	(3) 3/0–400	(3) 3/0–400	(12) 4/0–500
800	HNB	(4) 4/0–500	(4) 4/0–500	(12) 4/0–500
1000	HNB	(4) 4/0–500	(4) 4/0–500	(12) 4/0–500

Transfer Switch Ratings—Systems Coordination Information—Withstand, Closing and Interrupting Ratings ②

Standard UL 1008 3-Cycle—Horizontal and Vertical Industrial

ATS Ampere Rating	Any Breaker Rating			Ratings When Used With Upstream Fuse (kA)		
	240V	480V	600V	Maximum Fuse Rating	Fuse Type ③	600V
30	100	65	25	200	J,T	200
70	100	65	25	200	J,T	200
100	100	65	25	200	J,T	200
150	100	65	25	400	J,T	200
200	100	65	25	400	J,T	200
225	100	65	25	400	J,T	200
300	100	65	25	400	J,T	200
400	100	65	25	600	J,T	200
600	100	65 ④	25	800/1200	J,T	100/200
800	65	50 ④	25	1200/1600	L	100/200
1000	65	50 ④	25	1600	L	200

Notes

① All terminals suitable for copper or aluminum conductors. For alternate terminal sizes, contact Eaton.

② For maximum breaker ratings in circuits when the transfer switch is evaluated as a "Motor Branch Circuit Conductor," refer to NEC Section 430-25 for sizing.

③ Class RK5 fuse with 100 kA rating.

④ Four-pole units rated 35 kA.

Dimensions

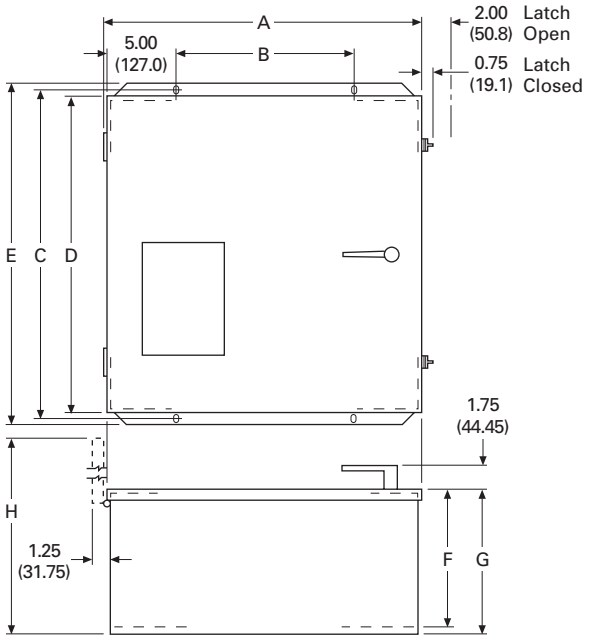
Approximate Dimensions in Inches (mm)

30–1000A Type MTVX

Switch Type	Enclosure A Height	B Width	C Depth	Gutter Space D Width	E Depth	F Bending	Bolt Pattern G Horizontal	H Vertical	Standard Terminals ① Line	Load	Neutral	Weight Lbs (kg)
HKD (150–225A)	48.00 (1219.2)	20.81 (528.6)	18.40 (467.4)	8.00 (203.2)	4.00 (101.6)	10.59 (269.0)	11.00 (279.4)	45.50 (1155.7)	(1) #3–350	(1) #6–350	(3) #4–350	305 (138)
HKD (300A)	56.00 (1422.4)	20.81 (528.6)	18.40 (467.4)	8.00 (203.2)	4.00 (101.6)	13.59 (345.2)	11.00 (279.4)	53.50 (1358.9)	(1) #3–350	(1) #6–350	(3) #4–350	395 (179)
HLD (400A)	64.00 (1625.6)	25.81 (655.6)	18.40 (467.4)	8.00 (203.2)	4.00 (101.6)	10.54 (267.7)	16.00 (406.4)	61.48 (1561.6)	(1) 4/0–600	(2) #1–500	(6) 250–350	395 (179)
HLD (400A) ②	53.00 (1346.2)	25.81 (655.6)	18.40 (467.4)	8.00 (203.2)	4.00 (101.6)	11.85 (301.0)	16.00 (406.4)	50.48 (1282.2)	(2) 3/0–350	(2) #1–500	(6) 250–350	395 (179)
HLD (600A)	64.00 (1625.6)	25.81 (655.6)	18.40 (467.4)	8.00 (203.2)	4.00 (101.6)	10.54 (267.7)	16.00 (406.4)	61.48 (1561.6)	(2) 3/0–350	(2) #1–500	(12) 4/0–500	395 (179)
HLD (600A) ②	64.00 (1625.6)	25.81 (655.6)	18.40 (467.4)	8.00 (203.2)	4.00 (101.6)	10.54 (267.7)	16.00 (406.4)	61.48 (1561.6)	(2) 400–500	(2) #1–500	(12) 4/0–500	395 (179)
HMDL (600A)	76.74 (1949.2)	25.81 (655.6)	19.50 (495.3)	8.00 (203.2)	4.00 (101.6)	17.73 (450.3)	16.00 (406.4)	75.15 (1908.8)	(2) #1–500	(2) #1–500	(12) 4/0–500	510 (232)
HMDL (800A)	76.74 (1949.2)	25.81 (655.6)	19.50 (495.3)	8.00 (203.2)	4.00 (101.6)	17.73 (450.3)	16.00 (406.4)	75.15 (1908.8)	(3) 3/0–400	(3) 3/0–400	(12) 4/0–500	510 (232)
NB (800–1000A)	76.74 (1949.2)	25.81 (655.6)	19.50 (495.3)	8.00 (203.2)	4.00 (101.6)	17.58 (446.5)	16.00 (406.4)	75.15 (1908.8)	(4) 4/0–500	(4) 4/0–500	(12) 4/0–500	540 (245)

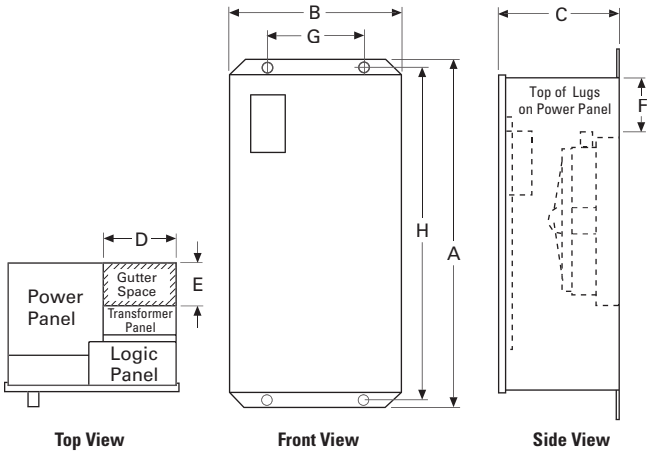
30–150A Type MTHXFD Manual

Dimensions A	B	C	D	E	F	G	H	Weight Lbs (kg)
22.88 (581.2)	13.13 (333.5)	22.74 (577.6)	22.62 (574.5)	24.50 (622.3)	9.78 (248.4)	10.28 (261.1)	32.31 (820.7)	143 (65)



Power Panel and Transformer Panel

Power Panel Type	Height	Width	Depth
Power Panel			
HFD	11.00 (279.4)	17.00 (431.8)	6.81 (173.0)
HKD	24.50 (622.3)	11.88 (301.8)	17.50 (444.5)
HLD	26.00 (660.4)	16.88 (428.8)	17.50 (444.5)
HMDL	36.25 (920.8)	16.88 (428.8)	17.50 (444.5)
NB	36.25 (920.8)	16.88 (428.8)	19.00 (482.6)
Transformer Panel			
HFD	22.00 (558.8)	16.50 (419.1)	6.50 (165.1)
HKD, HLD, HMDL and NB	28.63 (727.2)	8.25 (209.6)	5.50 (139.7)



Notes

① Suitable for Cu or Al wire. Consult the factory for other available terminal sizes.

② Alternate line terminals.

Dimensions are approximate and should not be used for construction purposes.

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Non-Automatic Wallmount

Contents

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Molded Case Switches—Non-Automatic Wallmount

Product Description

Eaton's wallmount non-automatic transfer switches are designed for a variety of standby power applications for critical loads.

In the event of a primary power source interruption, the user can manually transfer the load circuits to the standby power source through the use of an external pushbutton. Once primary power has been restored, the user can manually transfer the load circuits back to the primary power source through the use of an external pushbutton.

Non-Automatic Switch with Doors Closed

Note: Optional service entrance rating shown for this photo.

Application Description

Non-automatic transfer switches cover applications ranging from 30–1000A through 600 Vac for manual configurations, open transition, standard or service entrance.

Non-automatic transfer switches are manually initiated, but electrically operated designs. Front door-mounted controls allow the operator to initiate the transfer. Overcurrent trips may be added to the design for either or both the normal and emergency source. Service entrance ratings are available.

Features and Benefits

Features

- Molded case switch power contact assemblies
- Positive mechanical and electrical interlocking
- Permanently affixed manual operating handle
- Pushbutton operation

Benefits

- High withstand, totally enclosed for maximum arc suppression and isolation during power transfer
- Optional trip units offer system overcurrent protection
- Prevents the paralleling of two sources of power
- Permits safe and convenient manual transfer of power under load via external pushbutton initiated operation

Non-Automatic Transfer Switch

Device panel shows controls to initiate the manual transfer and control indicating lights. In addition, an optional service entrance rating may be specified. Keyed switch is mounted on the device panel.

Standards and Certifications

- Complies with UL 1008 and UL 489 standards
- IBC seismic qualified
- Meets American Bureau of Shipping (ABS) approval

Catalog Number Selection

Non-Automatic Breaker-Based Transfer Switch

NT H E KD C 2 0100 W S U

Type
NT = Non-automatic

Orientation
H = Horizontal
V = Vertical

Logic
E = Electro-mechanical

Frame
Molded case device
FD = 30–150A
KD = 150–300A
LD = 400–600A
MD = 600–800A
ND = 800–1000A

Mounting
Fixed
A = FM, N (MCS), E (MCS)
B = FM, N (MCB), E (MCB)
C = FM, N (MCB), E (MCS)
D = FM, N (MCS), E (MCB)

Number of Poles
2 = Two-pole
3 = Three-pole
4 = Four-pole

Amperes
0030 = 30A
0070 = 70A
0100 = 100A
0150 = 150A
0225 = 225A
0300 = 300A
0400 = 400A
0600 = 600A
0800 = 800A
1000 = 1000A

Voltage
A = 120V, 60 Hz
B = 208V, 60 Hz
E = 600V, 60 Hz
G = 220V, 50/60 Hz
H = 380V, 50 Hz
K = 600V, 50 Hz
M = 230V, 50 Hz
N = 401V, 50 Hz
O = 415V, 50 Hz
W = 240V, 60 Hz
X = 480V, 60 Hz
Z = 365V, 50 Hz

Enclosure
K = Open
S = NEMA 1
R = NEMA 3R
J = NEMA 12
L = NEMA 4
D = NEMA 4X

Certification
U = UL 1008 listed
R = UL recognized
X = No listing

Technical Data and Specifications

16

Wallmount Transfer Switch Standard Terminal Data for Power Cable Connections ①

Switch Ampere Rating	Breaker Frame	Line Side (Normal and Standby Source)	Load Connection	Neutral Connection
30–100	HFD	(1) #14–1/0	(1) #14–1/0	(3) #14–1/0
150–225	HFD	(1) #6–300	(1) #6–300	(3) #4–300
225–300	HKD	(1) #3–350	(1) #6–350	(3) #4–350
400	HLD	(1) 4/0–600	(2) #1–500	(6) 250–350
600	HLD	(1) 3/0–350	(2) #1–500	(6) 250–350
600	HMDL	(2) #1–500	(2) #1–500	(12) 4/0–500
600 (four-pole)	NB	(3) 3/0–400	(3) 3/0–400	(3) 3/0–400
800	HMDL	(3) 3/0–400	(3) 3/0–400	(12) 4/0–500
800	HNB	(4) 4/0–500	(4) 4/0–500	(12) 4/0–500
1000	HNB	(4) 4/0–500	(4) 4/0–500	(12) 4/0–500

Transfer Switch Ratings—Systems Coordination Information—Withstand, Closing and Interrupting Ratings ②

Standard UL 1008 Three-Cycle—Horizontal and Vertical Industrial

ATS Ampere Rating	Any Breaker Rating			Ratings When Used with Upstream Fuse (kA)		
	240V	480V	600V	Maximum Fuse Rating	Fuse Type ③	600V
30	100	65	25	200	J, T	200
70	100	65	25	200	J, T	200
100	100	65	25	200	J, T	200
150	100	65	25	400	J, T	200
200	100	65	25	400	J, T	200
225	100	65	25	400	J, T	200
300	100	65	25	400	J, T	200
400	100	65	25	600	J, T	200
600	100	65 ④	25	800/1200	J, T	100/200
800	65	50 ④	25	1200/1600	L	100/200
1000	65	50 ④	25	1600	L	200

Notes

① All terminals suitable for copper or aluminum conductors. For alternate terminal sizes, contact Eaton.

② For maximum breaker ratings in circuits when the transfer switch is evaluated as a "Motor Branch Circuit Conductor," refer to NEC Section 430-25 for sizing.

③ Class RK5 fuse with 100 kA rating.

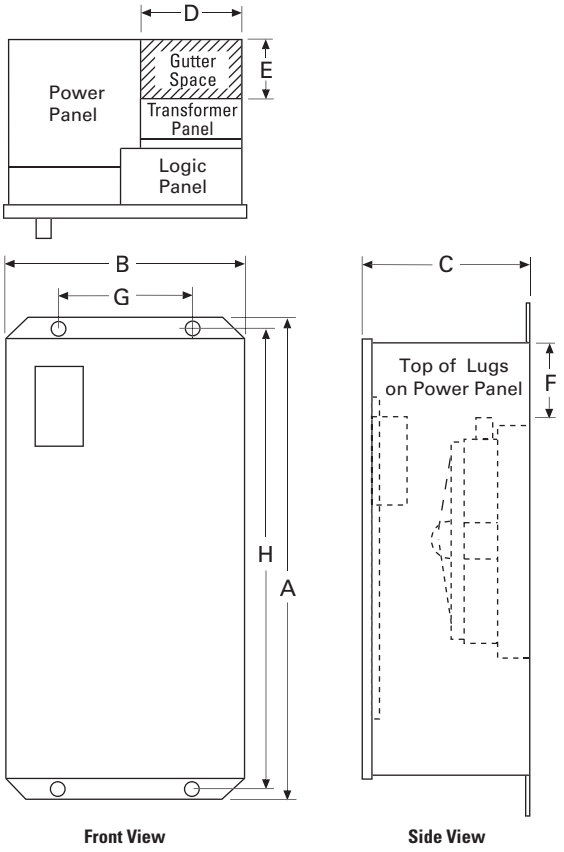
④ Four-pole units rated 35 kA.

Dimensions

Approximate Dimensions in Inches (mm)

30–1000A Types NTHE, NTVE

Switch Type	Enclosure A Height	B Width	C Depth	Gutter Space D Width	E Depth	F Bending	Bolt Pattern G Horizontal	H Vertical	Standard Terminals ① Line	Load	Neutral	Weight Lbs (kg)
HFD (30–100A) ②	47.74 (1213.0)	20.81 (528.6)	17.22 (437.0)	8.00 (203.2)	4.00 (101.6)	6.22 (157.9)	10.75 (273.0)	45.24 (1049.1)	(1) #14–1/0	(1) #14–1/0	(3) #14–1/0	227 (103)
HFD (150A) ②	47.74 (1213.0)	20.81 (528.6)	17.22 (437.0)	8.00 (203.2)	4.00 (101.6)	6.22 (157.9)	10.75 (273.0)	45.24 (1049.1)	(1) #6–300	(1) #6–300	(3) #4–300	227 (103)
HKD (150–225A)	48.00 (1219.2)	20.81 (528.6)	18.40 (467.4)	8.00 (203.2)	4.00 (101.6)	10.59 (269.0)	11.00 (279.4)	45.50 (1155.7)	(1) #3–350	(1) #6–350	(3) #4–350	305 (138)
HKD (300A)	56.00 (1422.4)	20.81 (528.6)	18.40 (467.4)	8.00 (203.2)	4.00 (101.6)	13.59 (345.2)	11.00 (279.4)	53.50 (1358.9)	(1) #3–350	(1) #6–350	(3) #4–350	395 (179)
HLD (400A)	64.00 (1625.6)	25.81 (655.6)	18.40 (467.4)	8.00 (203.2)	4.00 (101.6)	10.54 (267.7)	16.00 (406.4)	61.48 (1561.6)	(1) 4/0–600	(2) #1–500	(6) 250–350	395 (179)
HLD (400A) ③	53.00 (1346.2)	25.81 (655.6)	18.40 (467.4)	8.00 (203.2)	4.00 (101.6)	11.85 (301.0)	16.00 (406.4)	50.48 (1282.2)	(2) 3/0–350	(2) #1–500	(6) 250–350	395 (179)
HLD (600A)	64.00 (1625.6)	25.81 (655.6)	18.40 (467.4)	8.00 (203.2)	4.00 (101.6)	10.54 (267.7)	16.00 (406.4)	61.48 (1561.6)	(2) 3/0–350	(2) #1–500	(12) 4/0–500	395 (179)
HLD (600A) ③	64.00 (1625.6)	25.81 (655.6)	18.40 (467.4)	8.00 (203.2)	4.00 (101.6)	10.54 (267.7)	16.00 (406.4)	61.48 (1561.6)	(2) 400–500	(2) #1–500	(12) 4/0–500	395 (179)
HMDL (600A)	76.74 (1949.2)	25.81 (655.6)	19.50 (495.3)	8.00 (203.2)	4.00 (101.6)	17.73 (450.3)	16.00 (406.4)	75.15 (1908.8)	(2) #1–500	(2) #1–500	(12) 4/0–500	510 (232)
HMDL (800A)	76.74 (1949.2)	25.81 (655.6)	19.50 (495.3)	8.00 (203.2)	4.00 (101.6)	17.73 (450.3)	16.00 (406.4)	75.15 (1908.8)	(3) 3/0–400	(3) 3/0–400	(12) 4/0–500	510 (232)
NB (800–1000A)	76.74 (1949.2)	25.81 (655.6)	19.50 (495.3)	8.00 (203.2)	4.00 (101.6)	17.58 (446.5)	16.00 (406.4)	75.15 (1908.8)	(4) 4/0–500	(4) 4/0–500	(12) 4/0–500	540 (245)



Front View Side View

Power Panel and Transformer Panel

Power Panel Type	Height	Width	Depth
Power Panel			
HFD	11.00 (279.4)	17.00 (431.8)	6.81 (173.0)
HKD	24.50 (622.3)	11.88 (301.8)	17.50 (444.5)
HLD	26.00 (660.4)	16.88 (428.8)	17.50 (444.5)
HMDL	36.25 (920.8)	16.88 (428.8)	17.50 (444.5)
NB	36.25 (920.8)	16.88 (428.8)	19.00 (482.6)
Transformer Panel			
HFD	22.00 (558.8)	16.50 (419.1)	6.50 (165.1)
HKD, HLD, HMDL and NB	28.63 (727.2)	8.25 (209.6)	5.50 (139.7)

Notes

① Suitable for Cu or Al wire. Consult the factory for other available terminal sizes.
② NTHE with multi-tap voltage selection panel.
③ Alternate line terminals.

Automatic Wallmount

Contents

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Molded Case Switches—Automatic Wallmount

Product Description

Eaton's wallmount transfer switches are designed for a variety of standby power applications for critical loads. They provide flexibility, reliability and value in a compact package. In the event of a primary power source interruption, a transfer switch provides an effective means to transfer the load circuits to an alternate power source while reducing the possibility of injury or property damage.

Wallmount transfer switches meet or exceed all industry standards for endurance, reliability and performance.

These breaker-based designs can be applied with the ATC-100, ATC-300 or ATC-600 controllers.

Application Description

Suitable for emergency and standby systems (all loads).

Features, Benefits and Functions

Industrial Design Highlights

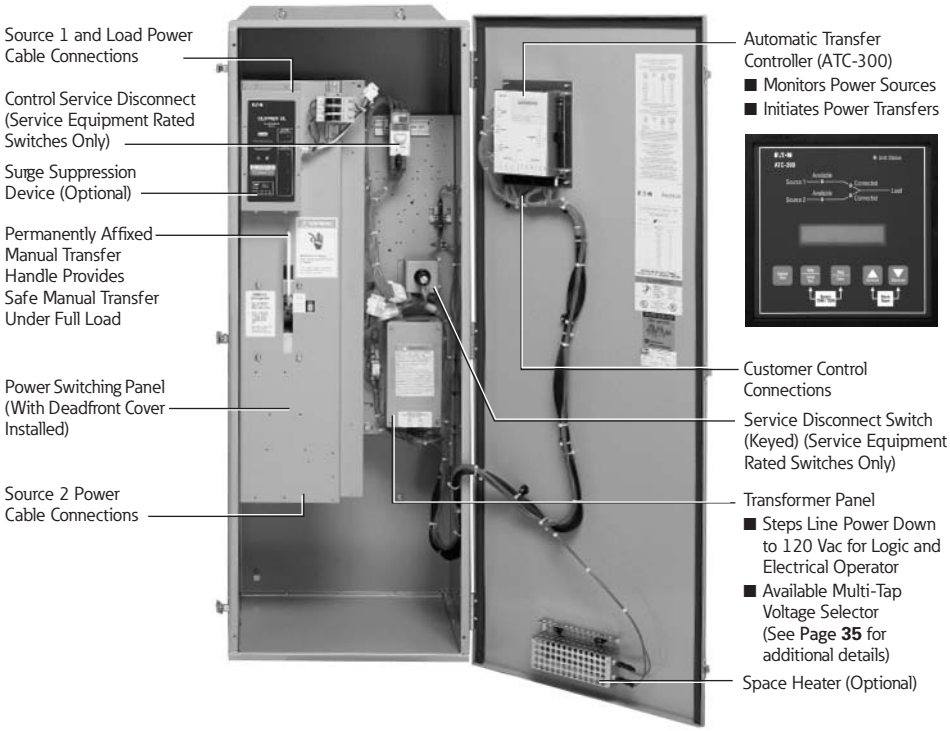
- Double-throw, mechanically interlocked transfer mechanism
- High withstand and closing ratings
- Seismic Zone 4 qualified (BOCA®, CBC, IBC, UBC®)

Standard Features

- Auxiliary relay contacts:
  - Source 1 present 2NO and 2NC
  - Source 2 present 2NO and 2NC
- Switch position indication contacts:
  - Source 1 position 1NO and 1NC
  - Source 2 position 1NO and 1NC
- Source 1 and Source 2 sensing:
  - Undervoltage/ underfrequency
  - Overvoltage/ overfrequency
  - Three-phase rotation protection
  - Three-phase voltage unbalance/loss
- Pretransfer signal contacts 1NO/1NC
- Go to emergency (Source 2)
- Seven field-programmable time delays
- LCD-based display for programming, system diagnostic and Help message display
- Mimic diagram with source available and connected LED indication
- Time-stamped history log
- System TEST pushbutton
- Programmable plant exerciser—OFF, daily, 7-, 14-, 28-day interval selectable run time 0–600 minutes no load/ load with fail-safe
- Safe manual operation under full load with permanently affixed operating handle

Optional Features

- Suitable for use as service equipment in the standard enclosure size
- Available TVSS for power/ controller, engine start circuit, phone and cable connections
- Integrated distribution panels
- Field-selectable multi-tap transformer panel permits operation on a wide range of system voltages
- Integral overcurrent protection
- Not available on contactor transfer switch
- Space heater with thermostat
- Ammeter—load side
- Stainless steel cover for controller


Source 1 and Load Power Cable Connections
Control Service Disconnect (Service Equipment Rated Switches Only)
Surge Suppression Device (Optional)
Permanently Affixed Manual Transfer Handle Provides Safe Manual Transfer Under Full Load
Power Switching Panel (With Deadfront Cover Installed)
Source 2 Power Cable Connections
Automatic Transfer Controller (ATC-300)
■ Monitors Power Sources
■ Initiates Power Transfers
Customer Control Connections
Service Disconnect Switch (Keyed) (Service Equipment Rated Switches Only)
Transformer Panel
■ Steps Line Power Down to 120 Vac for Logic and Electrical Operator
■ Available Multi-Tap Voltage Selector (See Page 35 for additional details)
Space Heater (Optional)

Basic Components of Automatic Transfer Switches

Eaton's Superior Design Transfer Switch Characteristics

Unmatched Performance and Versatility

Eaton's family of wallmount transfer switches offers unmatched performance, versatility and value for power switching applications. At the heart of these designs is Eaton's molded case switch, designed specifically to meet UL 1008.

Superior Main Contact Structure

All Eaton wallmount transfer switches meet or exceed the standards set forth in UL 1008 and UL 489. No other transfer switch manufacturer has met the rigid testing requirements of this combination of standards. Completely enclosed contacts add a measure of safety and reliability. It also ensures the integrity of the contact assemblies and minimizes the need for periodic maintenance of the contacts, reducing downtime.

Fast, Powerful and Safe Power Switching Mechanism

The power panel utilizes a unidirectional gear motor mechanism. The power panel can be operated manually under a FULL LOAD.

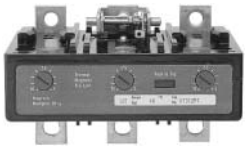
Molded Case Switch Features

- True four-pole switched neutral availability
- Totally enclosed contact assembly

Molded Case Switch

Optional Integral Overcurrent Protection Capability

For service entrance and other applications, trip units can be integrated into the power switching section. This eliminates the need for separate upstream protective devices, saving cost and space.



Optional Thermal-Magnetic or Electronic Trip Units

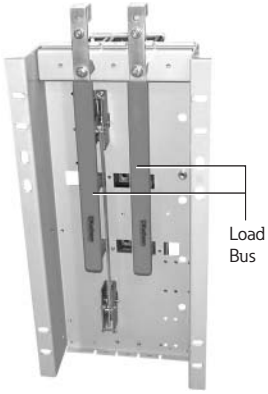
Mechanical Interlock

Wallmount transfer switches feature a rear-mounted, patented fail-safe mechanical interlock to prevent paralleling of sources. This is, in addition to software interlocking and the interlocking inherently provided by the transfer mechanism.

Triple Interlocks

Load Bus Assembly

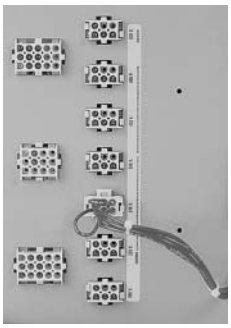
The load bus can be oriented for either top or bottom access. Top entry is standard.



Load Bus

Multi-Tap Voltage Selector

Eaton's industry-exclusive Multi-Tap system voltage selector allows our transfer switch to be applied on most system voltages just by proper insertion of the selector plug. Available in two configurations: Worldwide Multi-Tap with 600, 480, 415, 380, 240, 220 and 208 Vac, single- and three-phase, 50 and 60 Hz taps. North American Multi-Tap with 600, 480, 240, 208 and 120 Vac, single- and three-phase, 60 Hz taps.



Multi-Tap Voltage Selector

Ease of Maintenance

Keyed quick-disconnect plugs are provided for easy and complete isolation of the control circuitry.

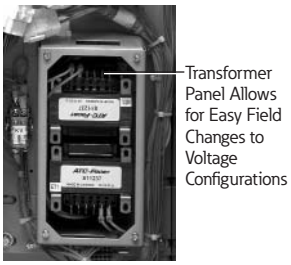
Maintenance can be performed on the logic independent from the power sections and still allow the user to manually transfer power under full load conditions.

Logic Disconnect Plugs

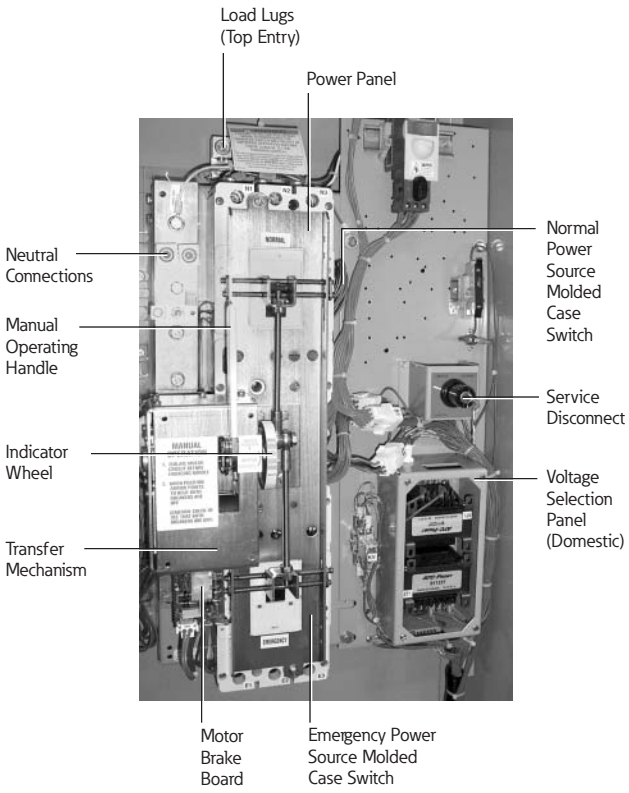
North American Voltage Selector

North American multi-tap transformer comes with 600, 480, 240, 208 and 120 Vac, single- and three-phase, and 60 Hz taps, which are all field selectable. Simply remove the steel cover and move the appropriate blue flag terminal to the desired voltage. All switches are shipped with the blue flag in the 600V position.

Transformer Panel Location



Transformer Panel Opened



Typical (225–1000A) Vertical Design Transfer Switch Equipment

16

Standards and Certifications

They are listed under Underwriters Laboratories UL 1008 Standard for transfer switch equipment and are optionally available as suitable for emergency and standby systems as defined in NFPA 99 for health care facilities.

- UL 1008 listed
- CSA® C22.2 No. 178 certified

Listed

Catalog Number Selection

Molded Case Transfer Switch

AT V 3 KD A 3 0400 X S U

Type
AT = Automatic
BI = Bypass isolation

Orientation
H = Horizontal
V = Vertical
C = Contactor

Logic
1 = ATC-100
3 = ATC-300
I = ATC-600

Frame Size (Amperes)
Molded case device ①
FD = 30–150
KD = 225–300
LD = 400
MD = 600 (three-pole only)
NB = 800–1000 ③

Switch ④
A = S1 (MCS) S2 (MCS)
B = S1 (MCB) S2 (MCB)
C = S1 (MCB) S2 (MCS)
D = S1 (MCS) S2 (MCB)
X = Fix mounted contactor

Number of Poles
2 = Two-pole
3 = Three-pole
4 = Four-pole ③

Amperes ②
0030 = 30A
0070 = 70A
0100 = 100A
0150 = 150A
0200 = 200A
0225 = 225A
0300 = 300A
0320 = 320A
0400 = 400A
0600 = 600A ③
0800 = 800A
1000 = 1000A
1200 = 1200A

Voltage
A = 120V, 60 Hz
B = 208V, 60 Hz
E = 600V, 60 Hz
G = 220V, 50/60 Hz
H = 380V, 50 Hz
K = 600V, 50 Hz
M = 230V, 50 Hz
N = 401V, 50 Hz
O = 415V, 50 Hz
W = 240V, 60 Hz
X = 480V, 60 Hz
Z = 365V, 50 Hz

Enclosure
K = Open
S = NEMA 1
J = NEMA 12
R = NEMA 3R
L = NEMA 4 ⑤
D = NEMA 4X ⑤

Certification
U = UL listed
R = UL recognized
X = No listing

Notes

① HFD = 200 and 225A, HLD = 600A, HMD = 800A for 240/120 Vac single-phase, three-wire and 208Y/120 Vac three-phase, four-wire systems only.
② The contactor-based transfer switch is currently available in 100, 200, 320, 400 and 600A only. Contact the factory for availability on the 800, 1000 and 1200A switch.
③ Four-pole 600A will use an NB breaker.
④ MCB = Molded Case Breaker, MCS = Molded Case Switch.
⑤ NEMA 4 and NEMA 4X requires an ATC-600 controller.

Technical Data and Specifications

Electrical Ratings

- Molded case and circuit breaker 30–1000A
- Two-, three- or four-pole
- Up to 600 Vac, 50/60 Hz
- NEMA 1, 3R, 12, open

Molded Case Transfer Switch and Circuit Breaker

UL 1008 Withstand and Close-On Ratings (kA)

Switch Ampere Rating	UL 1008 3-Cycle Any Breaker Rating			Ratings When Used with Upstream Fuse		
	240 Vac	480 Vac	600 Vac	Maximum Fuse Rating	Fuse Type	600 Vac
30–100	100	65	25	200	J, T	200
150	100	65	25	400	J, T	200
225	100	65	25	400	J, T	200
300	100	65	25	400	J, T	200
400	100	65	25	600	J, T	200
600 ①	100	65	25	1200	J, T	200
800 ①	65	50	25	1600	L	200
1000 ①	65	50	25	1600	L	200

Wallmount Transfer Switch Standard Terminal Data for Power Cable Connections ②

Switch Ampere Rating	Breaker Frame	Line Side (Normal and Standby Source)	Load Connection	Neutral Connection
30–100	HFD	(1) #14–1/0	(1) #14–1/0	(3) #14–1/0
150–225	HFD	(1) #6–300	(1) #6–300	(3) #4–300
150–225	HKD	(1) #3–350	(1) #6–350	(3) #4–350
225–300	HKD	(1) #3–350	(1) #6–350	(3) #4–350
400	HLD	(1) 4/0–600	(2) #1–500	(6) 250–350
600	HLD	(1) 3/0–350	(2) #1–500	(6) 250–350
600	HMDL	(2) #1–500	(2) #1–500	(12) 4/0–500
600 (four-pole)	NB	(3) 3/0–400	(3) 3/0–400	(3) 3/0–400
800	HMDL	(3) 3/0–400	(3) 3/0–400	(12) 4/0–500
800	HNB	(4) 4/0–500	(4) 4/0–500	(12) 4/0–500
1000	HNB	(4) 4/0–500	(4) 4/0–500	(12) 4/0–500

Notes

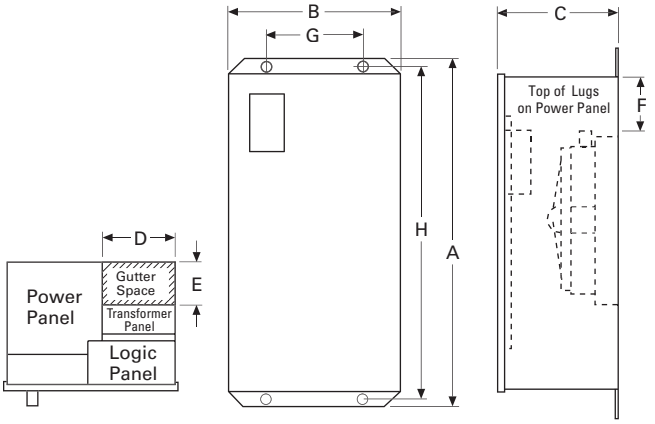
① For 600, 800 and 1000A ratings, single- through four-pole units are rated 35 kA.

② All terminals suitable for copper or aluminum conductors. For alternate terminal sizes, contact Eaton.

Dimensions

Approximate Dimensions in Inches (mm)

Dimension Views



Breaker-Based and Molded Case Transfer Switches

Switch Rating Amperes	Switch Type	Enclosure A Height	B Width	C Depth	Gutter Space D Width	E Depth	Bolt Pattern G Horizontal	H Vertical	Standard Terminals ① Line Side (Normal Load and Standby Source) Connection		Neutral Connection	Weight Lbs (kg)
Molded Case												
30–100	HFD ②	47.74 (1213.0)	20.81 (528.6)	17.22 (437.0)	8.00 (203.2)	4.00 (101.6)	10.75 (273.0)	46.44 (1180.0)	—	—	—	232 (105)
150–225	HFD ②	47.74 (1213.0)	20.81 (528.6)	17.22 (437.0)	8.00 (203.2)	4.00 (101.6)	10.75 (273.0)	46.44 (1180.0)	—	—	—	232 (105)
30–100	HFD ③	47.74 (1213.0)	20.81 (528.6)	17.22 (437.0)	8.00 (203.2)	4.00 (101.6)	10.75 (273.0)	46.44 (1180.0)	—	—	—	240 (190)
150	HFD ③	47.74 (1213.0)	20.81 (528.6)	17.22 (437.0)	8.00 (203.2)	4.00 (101.6)	10.75 (273.0)	46.44 (1180.0)	—	—	—	240 (190)
150–225	HFD ②	35.61 (904.0)	20.06 (509.5)	13.34 (339.0)	8.00 (203.2)	4.00 (101.6)	10.75 (273.0)	34.31 (904.0)	—	—	—	150 (68)
150–225	HKD	56.00 (1422.4)	20.81 (528.6)	18.40 (467.4)	8.00 (203.2)	4.00 (101.6)	11.00 (279.4)	45.50 (1155.7)	—	—	—	305 (134)
300	HKD	53.00 (1346.2)	25.81 (655.6)	18.40 (467.4)	8.00 (203.2)	4.00 (101.6)	11.00 (279.4)	53.50 (1358.9)	—	—	—	295 (134)
400	HLD	53.00 (1346.0)	25.81 (655.6)	18.40 (467.4)	8.00 (203.2)	4.00 (101.6)	16.00 (406.4)	51.50 (1308.0)	—	—	—	425 (193)
600	HLD ②	64.00 (1625.6)	25.81 (655.6)	18.40 (467.4)	8.00 (203.2)	4.00 (101.6)	16.00 (406.4)	62.50 (1588.0)	—	—	—	475 (214)
600	HMDL	76.74 (1949.2)	25.81 (655.6)	19.50 (495.3)	8.00 (203.2)	4.00 (101.6)	16.00 (406.4)	75.15 (1908.8)	—	—	—	480 (218)
800	HMDL ②	76.74 (1949.2)	25.81 (655.6)	19.50 (495.3)	8.00 (203.2)	4.00 (101.6)	16.00 (406.4)	75.15 (1908.8)	—	—	—	510 (232)
800–1000	HNB	76.74 (1949.2)	25.81 (655.6)	19.50 (495.3)	8.00 (203.2)	4.00 (101.6)	16.00 (406.4)	75.15 (1908.8)	—	—	—	540 (245)

Notes

① Suitable with copper only.
② 240/120V, single-phase, three-wire or 208V, three-phase, four-wire systems only.
③ With multi-tap voltage selection panel.

Type MBHE Maintenance Bypass Switch

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Maintenance Bypass Switches—Type MBHE 100–1000A

Product Description

Eaton's maintenance bypass switch is a UL 1008-listed device that provides a simple and effective means for bypassing un-interruptible power supplies while maintaining continuity of power to the critical computer loads. A maintenance bypass switch is a requirement on every UPS installation in order to accommodate the maintenance and testing of the UPS system.

Features and Benefits

- Make-before-break electrical operation
- Lockout circuit to be wired into the UPS bypass authorization
- Pilot devices to show UPS position "Normal" and "Bypassed"
- Pilot device to show "Lockout" enabled
- Reliable manually initiated electrical operation
- High interrupting ratings are standard
- Molded case switch designs are available
- Solid neutral connections are standard
- Safe and reliable operation is ensured due to the simple and durable switching design
- Unauthorized bypass is prevented by the need of UPS system to send the bypass authorized signal
- 100% current ratings makes selection to the UPS kVA ratings easy to accomplish
- Use of interrupting rating switches makes the maintenance bypass switches adaptable to systems with high levels of available fault current

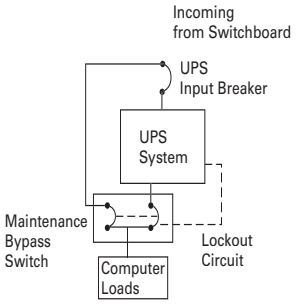
Standards and Certifications

- UL 1008 listing—File E61639

UL Listed

Wiring Diagram

Single Line Diagram of Maintenance Bypass Switch



16

Catalog Number Selection

Transfer Switch Equipment

MB H E FD A 3 0030 A S U

Type
MB = Maintenance Bypass

Orientation
H = Horizontal

Logic
E = Electromechanical

Frame Size (Amperes)
Molded case
FD = HFD (100A, 150A)
KD = HKD (150A, 225A, 300A)
LD = HLD (400A)
NB = NB (600A, 1000A)

Switch
A = Fix mounted, molded case switch (MCS) both

Number of Poles
2 = Two-pole
3 = Three-pole
4 = Four-pole

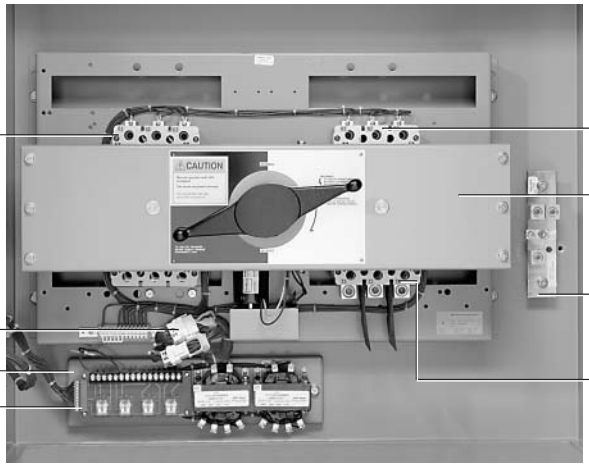
Amperes
0100 = 100A
0150 = 150A
0225 = 225A
0300 = 300A
0400 = 400A
0600 = 600A
0800 = 800A
1000 = 1000A

Voltage
A = 120V, 60 Hz
B = 208V, 60 Hz
W = 240V, 60 Hz
X = 480V, 60 Hz

Enclosure
K = Open
S = NEMA 1
J = NEMA 12
R = NEMA 3R
L = NEMA 4
D = NEMA 4X

Certification
U = UL listed

Technical Data and Specifications



Maintenance Bypass Switch

Standard Withstand, Closing and Interrupting Ratings ①

Transfer Switch Ampere Rating	Rating When Used with Upstream Circuit Breaker				Rating When Used with Upstream Fuse		
	Suggested Breaker Rating ②	240V	480V	600V	Maximum Fuse Rating	Fuse Type	480V
100	100	100	65	25	200	J, T	200
150	150	100	65	25	400	J, T	200
225	225	100	65	25	400	J, T	200
300	300	100	65	25	400	J, T ③	200
400	400	65	35	25	600	J, T	200
600	600	65	50	25	800/1200	J, T	100/200
800	800	65	50	25	1200/1600	L	100/200
1000	1000	65	50	25	1600	L	200

Notes

① Tested in accordance with UL 1008.

② For maximum breaker rating in circuits where the transfer switch is evaluated as a "motor branch circuit conductor" refer to the NEC® Section 430-25 for sizing.

③ Also can use Class RK5 fuse with 100 kA rating.

To attain the maximum rating shown in the chart, when protected by an upstream breaker, the upstream device must have an equivalent interrupting rating.

Dimensions

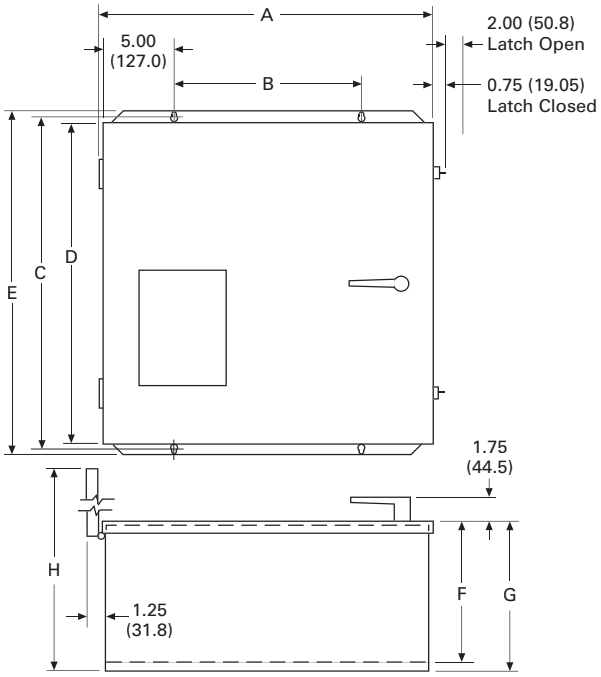
Approximate Dimensions in Inches (mm)

Manual Transfer and Maintenance Bypass Switches—100–150A Type MTHXFD Manual /100–1000A Type MBHE Maintenance Bypass

Manual and Maintenance Bypass Enclosures

	Dimensions							
Amperes	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
100–150	22.88 (581.2)	13.13 (333.5)	22.74 (577.6)	22.62 (574.5)	24.50 (622.3)	9.78 (248.4)	10.28 (261.1)	32.31 (820.7)
225–300	38.88 (987.6)	29.13 (739.9)	35.74 (907.8)	35.62 (904.7)	37.50 (952.5)	17.28 (438.9)	17.78 (438.9)	55.81 (1417.6)
400	38.88 (987.6)	29.13 (739.9)	35.74 (907.8)	35.62 (904.7)	37.50 (952.5)	17.28 (438.9)	17.78 (438.9)	55.81 (1417.6)
600	38.88 (987.6)	29.13 (739.9)	49.74 (1263.4)	49.62 (1260.3)	51.50 (1308.1)	17.28 (438.9)	17.78 (438.9)	55.81 (1417.6)
800	38.88 (987.6)	29.13 (739.9)	49.74 (1263.4)	49.62 (1260.3)	51.50 (1308.1)	17.28 (438.9)	17.78 (438.9)	55.81 (1417.6)
1000	38.88 (987.6)	29.13 (739.9)	59.74 (1517.4)	59.62 (1514.3)	61.50 (1562.1)	17.28 (438.9)	17.78 (438.9)	55.81 (1417.6)

Manual and Maintenance Bypass Switches



16.4 Transfer Switches

Magnum-Based Designs

Floor-Standing Magnum Transfer Switch

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Floor-Standing Magnum Transfer Switches

Product Description

Eaton's Magnum transfer switches are designed for a variety of standby power applications for critical and noncritical loads. They monitor both Source 1 (Normal) and Source 2 (Emergency) power sources. In the event of a Source 1 power interruption, these switches will automatically transfer the load circuits to the Source 2 power source. Once Source 1 power source has been restored, the process is automatically reversed.

Application Description

The Magnum family of transfer switches covers applications ranging from 200 to 5000A through 600 Vac. Some of the applications are: automatic or non-automatic configurations, open or closed transition and standard or rated suitable for use as service entrance. They are designed for applications where total system coordination must be accomplished while achieving a high level of Withstand, Interrupting, and Closing performance.

Drawout construction is available for applications, such as critical life-support systems, where preventive maintenance, inspection and testing must be accomplished while maintaining continuity of power to the load.

Features, Benefits and Functions

- Freestanding
- Magnum insulated case devices
- Fastest switching times available (<3 cycles)
- High withstand ratings
- Full 60-cycle short-time withstand capability
- Safe manual transfer under load
- Multi-tap voltage selection plug
- Integral service entrance capability
- Integral overcurrent protection capability
- Drawout capability
- Programmable microprocessor controller with keypad entry and display
- Communications capable
- Durable powder-coated steel enclosures
- UL 489 and UL 1008 listed. 4000 and 5000A available as UL 891 only
- 85–100 kA standard withstand ratings
- 30-cycle, extended withstand ratings
- Electrically operated
- True four-pole switched neutral availability
- Totally enclosed contact assembly

Magnum Drawout Transfer Switch

2000A, Three-Pole NEMA 1 Enclosed Drawout

- Drawout construction with switch position indicator
- Completely interchangeable power switching devices
- Available in NEMA Type 1 and 3R enclosures
- Rear, side and top cable access

Eaton's Drawout Magnum Switch should be considered for any systems requiring either greater redundancy, easier maintainability, or where true selective coordination is desired.

Eaton's Drawout Magnum Switch provides the capability to isolate either of the two power sources (Source 1 or Source 2) and its associated logic while maintaining power to the load.

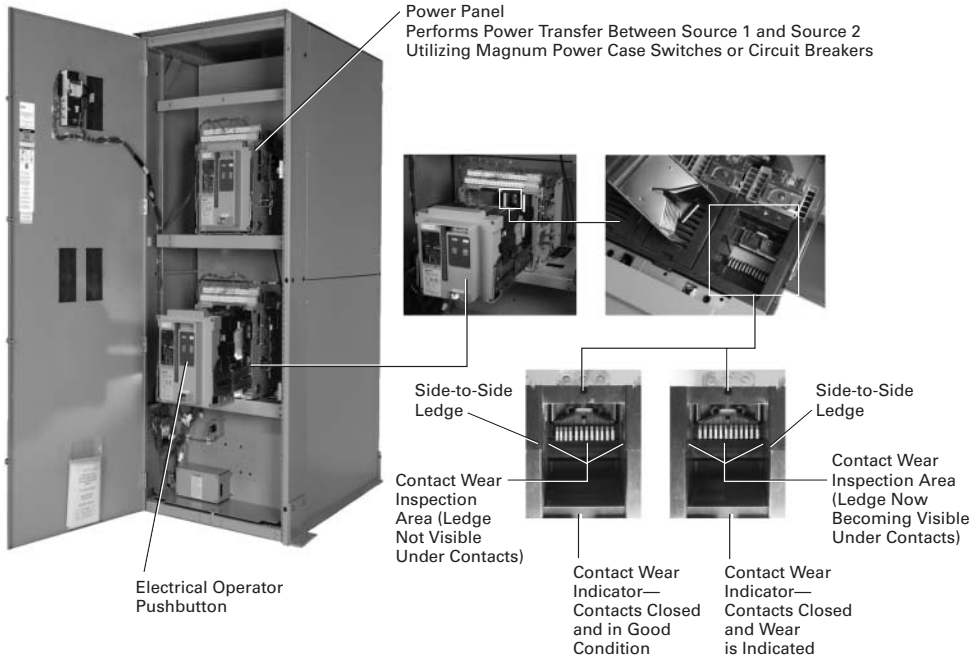
Each switching section is independent and can be replaced either with a spare switch, or for less critical replacement needs, a replacement unit is available from the factory.

Magnum Fixed Mount Transfer Switch

2000A, Four-Pole, NEMA 1 Enclosed, Through-the-Door Design

- Fixed-mount construction
- Available in NEMA Type 1 and 3R enclosures
- Rear, side and top cable access

2000A Three-Pole Fixed Design NEMA Behind-the-Door Enclosure


Power Panel
Performs Power Transfer Between Source 1 and Source 2
Utilizing Magnum Power Case Switches or Circuit Breakers
Side-to-Side Ledge
Side-to-Side Ledge
Contact Wear Inspection Area (Ledge Not Visible Under Contacts)
Contact Wear Inspection Area (Ledge Now Becoming Visible Under Contacts)
Contact Wear Indicator—Contacts Closed and in Good Condition
Contact Wear Indicator—Contacts Closed and Wear is Indicated
Electrical Operator Pushbutton

Basic Switch Components of Magnum Automatic Transfer Switches

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Logic

Application Versatility
Whether the application calls for open or closed transition, Eaton has the right logic controller for the task. ATC-600/800 controllers have set a new standard for transfer switch technology featuring:

- Microprocessor-based logic
- Digital display
- Field set point programmability
- Transfer history
- PowerNet™ Communications capability
- Voltmeter and frequency meter
- True rms voltage sensing
- Mimic BUS/LED display
- Load voltage decay delayed transition capability
- In-phase monitor capability
- Field upgrade capability

Automatic Transfer Open Transition
Open transition type Magnum transfer switches utilize the Eaton programmable ATC-600 microprocessor-based logic controller.

Refer to technical data TD.15A.05.T.E Open Transition ATC-600 for Automatic Transfer Switches for additional information.

ATC-600

Automatic Transfer Closed Transition
Closed transition applications feature the ATC-800 Closed Transition logic controller.

Refer to technical data TD.15A.09.T.E Closed Transition ATC-800 for Automatic Transfer Switches for additional information.

ATC-800 Closed Transition

Unmatched Performance and Versatility
The Eaton family of Magnum transfer switches offers unmatched performance, versatility and value for standby power applications. At the heart of these designs is the Magnum switch with the following features:

Superior Main Contact Structure
All Eaton Magnum Transfer Switches meet or exceed the standards set forth in UL 1008 and UL 489 with high withstand, totally enclosed Magnum switches. No other transfer switch manufacturer has met the rigid testing requirements of this combination of standards. Completely enclosed contacts add a measure of safety and reliability. They also ensures the integrity of the contact assemblies and minimizes the need for periodic maintenance of the contacts, reducing downtime and maintenance time.

Fast, Powerful and Safe Switching Mechanism
The mechanism utilizes a high speed ≤ than 3-cycle stored energy switching mechanism. This mechanism can be operated manually under a FULL LOAD.

Ease of Coordination and Application—Short-Time Withstand
The use of electronic trips has allowed performance curve shaping to facilitate proper system coordination. The most significant is the "short time" rated trip unit. These trip settings may be set for what are considered extremely high currents for much longer durations than the three-cycle withstand test required under UL 1008. To facilitate improved coordination, Eaton Magnum transfer switches have been tested and are provided with 30-cycle, extended withstand ratings.

Magnum Power Case Switch

Optional Integral Overcurrent Protection Capability

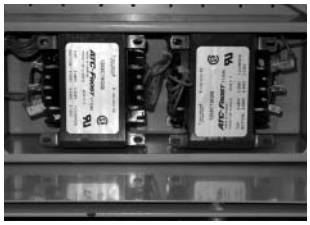
Optional Digitrip™ Magnum Trip Unit

Service Entrance
For service entrance and other applications, Digitrip solid-state trip units can be integrated into the power switching section. This eliminates the need for separate upstream protective devices, saving cost and space. Available with various combinations of long, short time, instantaneous, ground fault protection and communications.

Interlocking for Open Transition Applications
The open transition type Magnum Transfer Switches feature both mechanical (cable) and electrical interlocking to prevent paralleling of sources.

Mechanical Cable Interlock

Multi-Tap Voltage Selector
Allows the transfer switch to be readily applied on most system voltages worldwide by connecting to the proper terminals. Available system voltages include 120, 208, 220, 230, 240, 380, 401, 415, 480, or 600 Vac, 50 or 60 Hz.

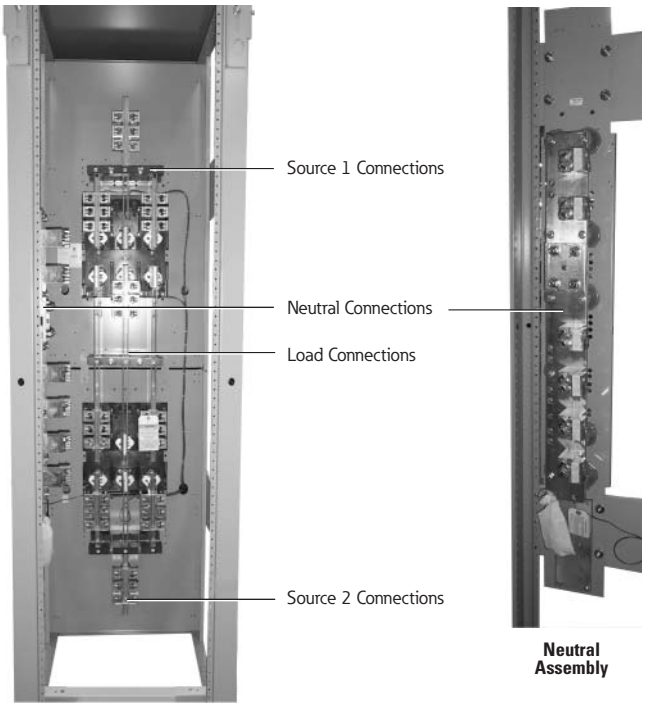


Voltage Selection Terminals

Ease of Maintenance
Keyed quick-disconnect plugs are provided for easy and complete isolation of the control circuitry.

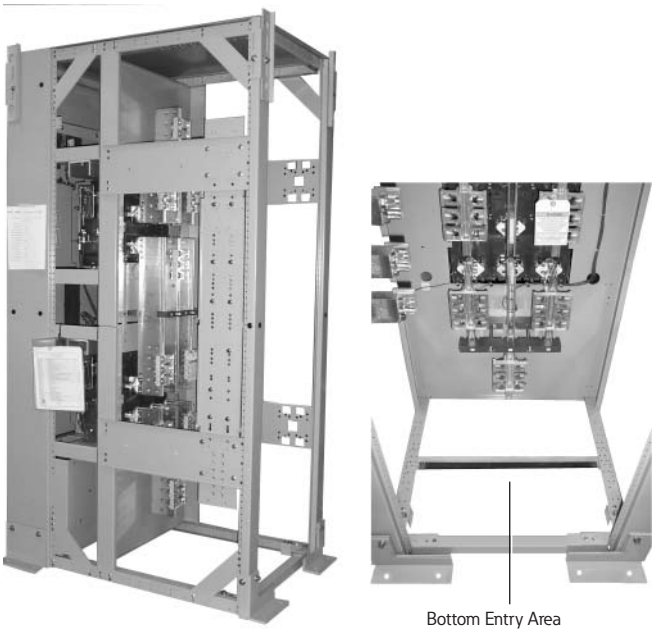
Maintenance can be performed on the logic independent from the power sections and still allow the user to manually transfer power under full load conditions.

Logic Disconnect Plugs



Neutral Assembly

Magnum-Based Transfer Switches



Side View of Magnum
Side or Rear Access Required
(Half-High Side Panels and Back Panels are Not Shown)

Magnum-Based Transfer Switches

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Product Selection

Eaton transfer switch equipment offers flexibility and versatility to the system designer and user. All switches include the basic features necessary for normal operation as standard. Eaton also offers an extensive array of optional features/accessories that allows the user to customize a new transfer switch to match the application. Select the appropriate catalog number for the application. Then choose any optional features/accessories needed to complete the project requirements.

Catalog Number:
ATVIMGB33200XRU with Optional Features 16B, 37B and 42

The example above would specify the following:

- Automatic transfer switch
- Vertical configuration
- ATC-600 logic
- Magnum DS frame
- Fixed mount
- Three-pole
- 3200A
- 480V
- NEMA 1 enclosure
- UL listed
- ATC-600 Transfer Logic
- Integral overcurrent protection both sources
- Service entrance rated with ground fault protection
- Seismic qualified

Catalog Number Selection

Using the catalog numbering system provides an overview of the ten basic style/feature categories that generate the 15-digit catalog number.

Magnum Automatic and Non-Automatic Transfer Switches 200–5000A

AT V I MG B 3 3200 X R U

Type
AT = Automatic
CT = Closed transition
NT = Non-auto

Orientation
V = Vertical

Logic
I = ATC-600 (open transition)
I = ATC-800 (closed transition)
E = Electro-mechanical

Frame
MG = Magnum DS

Switch
A = Fixed mount, power case switch PCS both
B = Fixed mount, power case circuit breaker PCB both
C = Fixed mount, PCB normal, PCS emergency
D = Fixed mount, PCS normal, PCB emergency
E = Drawout, PCS both
F = Drawout, PCB both
G = Drawout, PCB normal, PCS emergency
H = Drawout, PCS normal, PCB emergency

Poles
2 = Two-pole
3 = Three-pole
4 = Four-pole

Amperes
0200 = 200A
0300 = 300A
0400 = 400A
0600 = 600A
0800 = 800A
1000 = 1000A
1200 = 1200A
1600 = 1600A
2000 = 2000A
2500 = 2500A
3000 = 3000A
3200 = 3200A
4000 = 4000A
5000 = 5000A

Voltage
A = 120V, 60 Hz, three-phase, three-wire
B = 208/120V, 60 Hz, three-phase, four-wire
E = 600V, 60 Hz, three-phase, three-wire
E = 600V, 60 Hz, three-phase, four-wire
G = 220/127V, 50 Hz, three-phase, four-wire
H = 380/220V, 50 Hz, three-phase, four-wire
M = 230V, 50 Hz, three-phase, four-wire
M = 230V, 50 Hz, single-phase, three-wire
O = 415/240V, 50 Hz, three-phase, four-wire
W = 240/120V, 60 Hz, single-phase, three-wire
W = 240V, 60 Hz, three-phase, three-wire
W = 240/120V, 60 Hz, three-phase, four-wire hi-leg
W = 230/115V, 60 Hz, single-phase, three-wire
X = 480V, 60 Hz, three-phase, three-wire
X = 480/277V, 60 Hz, three-phase, four-wire
X = 480/240V, 50 Hz, single-phase, two-wire

Enclosure
K = Open ①
S = NEMA 1
R = NEMA 3R
T = Through-door design

Listing
U = UL listed CSA listed

Legend:
PCS = Power Case Switch
PCB = Power Circuit Breaker

Note
① Available on fixed mounted units up to 3200A.

Standards and Certifications

Eaton Magnum transfer switches meet or exceed all industry standards for endurance, reliability and performance. They are listed under Underwriters Laboratories UL 1008 Standard for transfer switch equipment. With certain options, they also comply with Source 2 and standby system requirements as defined in NFPA 99 for health care facilities.

- UL 1008—standard for safety for automatic transfer switches 4000 and 5000A available as UL 891 only
- UL 489—standard for circuit breakers and molded case switches
- CSA 22.2-178—Canadian transfer switch standard
- NEC articles—code sections 517, 700, 701, 702—applicable switch equipment
- NFPA 110—Source 2 and Standby Power Systems
- NFPA 99—health care facilities
- EGSA 100S—standard for transfer switches
- NEMA ICS10—Standard for transfer switch equipment
- UBC—Uniform Building Code for Seismic Zone 4
- ISO® 9000—International Organization for Standardization
- CBC—California Building Code
- IBC—International Building Code
- BOCA—Building Officials Code Administrators

Technical Data and Specifications

Floor-Standing Magnum Transfer Switch

- Ambient temperature range: –40°C to 40°C (–40°F to 104°F)
- Operating temperature range: –20°C to 70°C (–4°F to 158°F)
- Operating humidity: up to 90%
- Relative humidity (noncondensing)

Magnum Drawout Transfer Switch

- 200–5000A
- Two-, three-, four-pole (except 4000A: two- and three-pole only)
- 120–600 Vac
- 100,000A withstand/ closing/interrupting at 480 Vac
- Short-time withstand– 85,000 for 30 cycles

Magnum Fixed-Mount Transfer Switch

- 200–5000A
- Two-, three-, four-pole (except 3200A: two- and three-pole only)
- 120–600 Vac
- 100,000A withstand/ closing/interrupting at 480 Vac
- Short-time withstand– 85,000 for 30 cycles

Transfer Switch Withstand Ratings

Systems Coordination Information—Withstand, Closing and Interrupting Ratings

Transfer Switch Ampere Rating	Rating When Used with Upstream Circuit Breaker 3 Cycle 600V (kA)	Rating When Used with Upstream Fuse 30 Cycle 600V (kA)
800	100	85
1000	100	85
1200	100	85
1600	100	85
2000	100	85
2500	100	85
3200	100	85
4000	100	85
5000	100	85

Tested in accordance with UL 1008. Eaton Drawout Magnum Transfer Switch will coordinate with a power switching device short-time rating. Contact factory for details.

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Dimensions

Approximate Dimensions in Inches (mm)

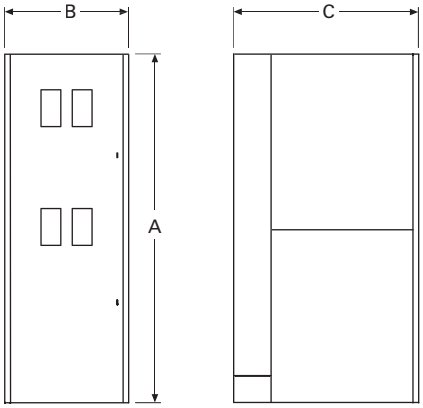
Magnum Fixed-Mount Transfer Switches

Ampere Rating	Number of Poles	A Height	B Width	C Depth	Shipping Weight Lbs (kg)
NEMA 1 Enclosed Fixed-Mount Transfer Switch					
200–2000	2	90.00 (2286.0)	32.00 (812.8)	48.00 (1219.2)	1050 (477)
200–2000	3	90.00 (2286.0)	32.00 (812.8)	48.00 (1219.2)	1050 (477)
200–2000	4	90.00 (2286.0)	32.00 (812.8)	48.00 (1219.2)	1250 (568)
2500–3200	2	90.00 (2286.0)	44.00 (1117.6)	48.00 (1219.2)	1900 (863)
2500–3200	3	90.00 (2286.0)	44.00 (1117.6)	48.00 (1219.2)	1900 (863)
2500–3200	4	90.00 (2286.0)	44.00 (1117.6)	48.00 (1219.2)	2000 (910)
4000 ①	—	①	①	①	①
5000 ①	—	①	①	①	①
NEMA 3R Enclosed Fixed-Mount Transfer Switch					
200–2000	2	90.00 (2286.0)	32.00 (812.8)	63.00 (1600.2)	1600 (726)
200–2000	3	90.00 (2286.0)	32.00 (812.8)	63.00 (1600.2)	1600 (726)
200–2000	4	90.00 (2286.0)	32.00 (812.8)	63.00 (1600.2)	1600 (726)
2500–3200	2	90.00 (2286.0)	44.00 (1117.6)	63.00 (1600.2)	2400 (1090)
2500–3200	3	90.00 (2286.0)	44.00 (1117.6)	63.00 (1600.2)	2400 (1090)
2500–3200	4	90.00 (2286.0)	44.00 (1117.6)	63.00 (1600.2)	2400 (1090)
2500–3200	4	90.00 (2286.0)	44.00 (1117.6)	63.00 (1600.2)	2400 (1090)
4000	—	①	①	①	—
5000	—	①	①	①	—

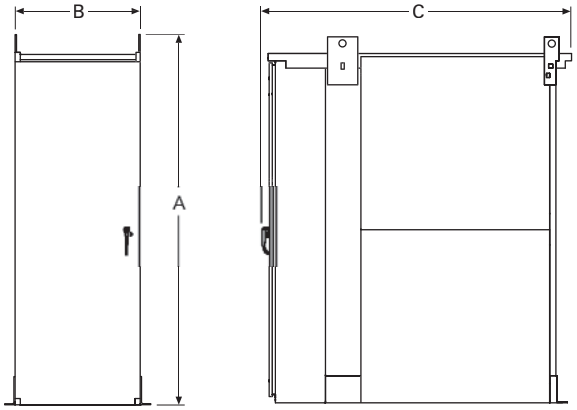
Note

① At 4000 and 5000A, the standard design is drawout. See drawout dimensions.

200–3200A Fixed-Mount NEMA 1



200–3200A Fixed-Mount NEMA 3R



Approximate Dimensions in Inches (mm)

Magnum Drawout Transfer Switches ①

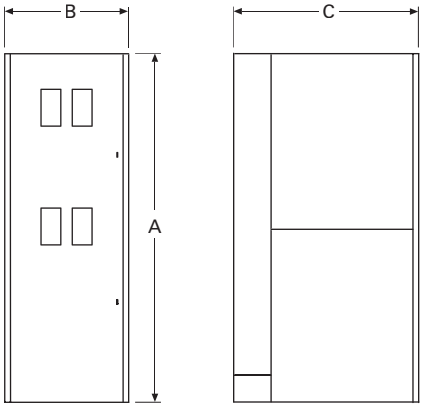
Ampere Rating	Number of Poles	A Height	B Width	C Depth	Shipping Weight Lbs (kg)
NEMA 1 Enclosed Drawout Transfer Switch					
200–2000	2	90.00 (2286.0)	32.00 (812.8)	60.00 (1524.0)	1600 (727)
200–2000	3	90.00 (2286.0)	32.00 (812.8)	60.00 (1524.0)	1600 (727)
200–2000	4	90.00 (2286.0)	32.00 (812.8)	60.00 (1524.0)	1900 (864)
2500–3200	2	90.00 (2286.0)	44.00 (1117.6)	60.00 (1524.0)	2500 (1136)
2500–3200	3	90.00 (2286.0)	44.00 (1117.6)	60.00 (1524.0)	2500 (1136)
2500–3200	4	90.00 (2286.0)	44.00 (1117.6)	60.00 (1524.0)	2800 (1273)
4000	2 or 3	90.00 (2286.0)	86.00 (2184.4)	68.00 (1727.2)	②
4000	4	90.00 (2286.0)	92.00 (2336.8)	68.00 (1727.2)	②
5000	2 or 3	90.00 (2286.0)	86.00 (2184.4)	68.00 (1727.2)	②
5000	4	②	②	②	②
NEMA 3R Enclosed Drawout Transfer Switch					
200–2000	2	90.00 (2286.0)	32.00 (812.8)	75.00 (1905.0)	2100 (953)
200–2000	3	90.00 (2286.0)	32.00 (812.8)	75.00 (1905.0)	2100 (953)
200–2000	4	90.00 (2286.0)	32.00 (812.8)	75.00 (1905.0)	2400 (1090)
2500–3200	2	90.00 (2286.0)	44.00 (1117.6)	75.00 (1905.0)	3000 (1362)
2500–3200	3	90.00 (2286.0)	44.00 (1117.6)	75.00 (1905.0)	3000 (1362)
2500–3200	4	90.00 (2286.0)	44.00 (1117.6)	75.00 (1905.0)	3000 (1362)
4000	2 or 3	90.00 (2286.0)	86.00 (2184.4)	82.35 (2091.7)	②
4000	4	90.00 (2286.0)	86.00 (2184.4)	82.35 (2091.7)	②
5000	2 or 3	90.00 (2286.0)	②	②	②
5000	4	90.00 (2286.0)	②	②	②

Notes

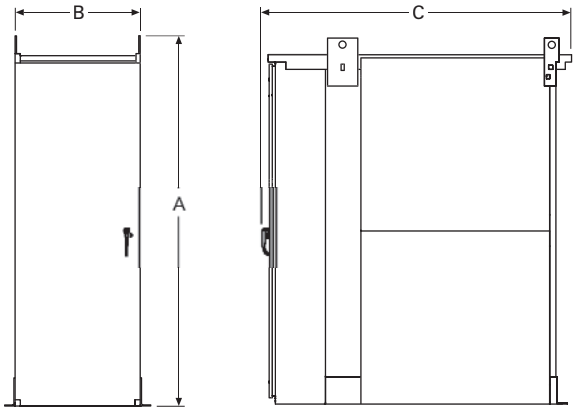
① A wireway is required, See Connection Type table on **Page 50**.

② Consult factory.

200–3200A Drawout NEMA 1



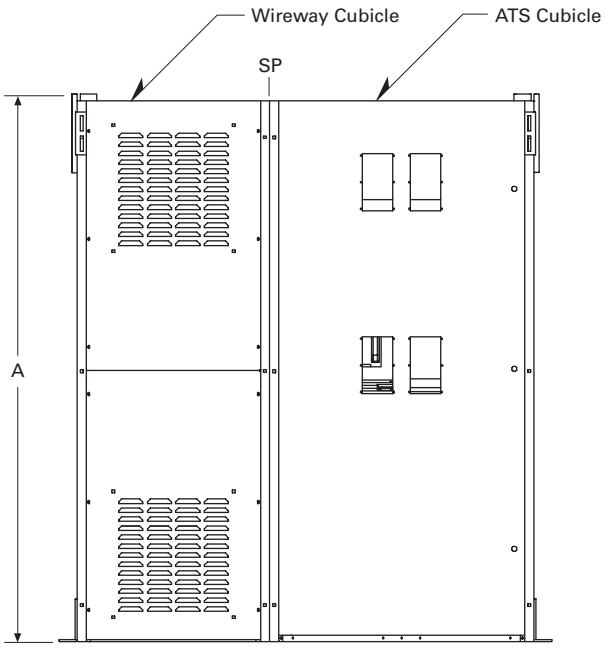
200–3200A Drawout NEMA 3R



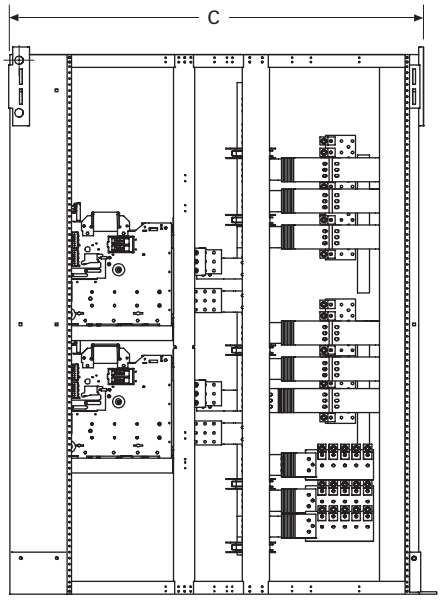
16

Approximate Dimensions in Inches (mm)

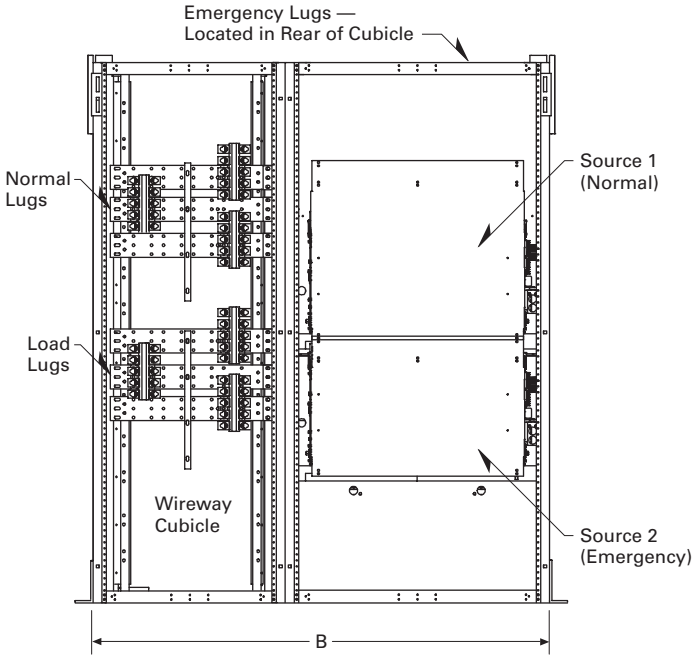
Magnum 4000–5000A Units



Front View With Covers



Right Side View



Front View Without Covers

SP = Shipping Split.
Consult factory for dimensions.

Connection Type (4000–5000A Only)

Connection Type

Line	Emergency	Load	Wireway
Cable	Cable	Cable	Yes
Bus	Cable	Cable	Yes
Cable	Bus	Cable	Yes
Cable	Cable	Bus	Yes
Bus	Bus	Cable	No
Bus	Cable	Bus	No
Cable	Bus	Bus	No
Bus	Bus	Bus	No

Note: The typical Magnum ATS at 4000 and 5000A ratings will include one cubicle with the Source 1 and Source 2 power case switches or breakers. A second cubicle called a wireway is most likely required unless bus is used for the connections per Connection Type table above. Cable connections to the wireway cubicle can be made from the top or bottom. The wireway cubicle will have removable panels on the front, and cable connections may be made from the top or the bottom. Cable connections to the power case switch or breaker cubicle are made from the back. Consult factory for dimensions. The wireway width is 32.00 inches (812.8 mm).

Bypass Isolation Transfer Switch

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Technical Data and Specifications	**54**
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Bypass Isolation Transfer Switch

Product Description

A bypass isolation switch utilizes loadbreak isolation and bypass transfer power contacts. Thus, should voltage be lost on the line to which the ATS is connected, and should a manual bypass be required to the other line, this can be accomplished safely and quickly as described below. With contactor designs utilizing non-loadbreak isolation and bypass switches, manual bypass to the other line is hindered by mechanical or electrical safety interlocking.

Application Description

The bypass isolation switch is designed for applications where maintenance, inspection and testing must be performed while maintaining continuous power to the load. This is typically required in critical life-support systems and standby power situations calling for safe system maintenance with no power disruptions. Such a design allows for the quick removal of the different switching devices for inspection, maintenance or replacement.

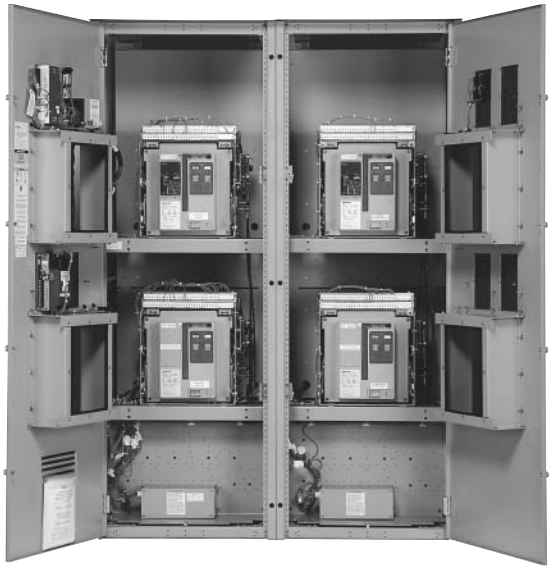
Features, Benefits and Functions

Eaton's transfer switch is a rugged, compact design utilizing Magnum power switches or Magnum power circuit breakers to transfer essential loads from one power source to another. Open transition switching devices are interlocked to prevent both switching devices from being closed at the same time. The versatile design, in addition to standard transfer functions, offers an optional integral thermal and short-circuit protection in either or both switching devices.

The switching devices are in a compact vertical arrangement. The logic can be easily disconnected from the switching device without disturbing critical connections. The enclosure is free standing, and by using the specially supplied cleats, the switch is seismic approved (Option 42). The terminals are mounted in the rear of the switch, permitting rear, top, bottom or side cable or bus bar entrance.

The switching devices have a high withstand rating. The high-speed, stored-energy switching mechanism guarantees a transfer time of less than three cycles.

- Reliable microprocessor logic
- Designed to safely withstand fault currents
- Eliminates need for complex interlocks
- Most versatile bypass isolation transfer switch available
- Eaton drawout cassette design
- Overcurrent protection available
- No loadbreak when bypassing to the same source
- Drawout capabilities on both ATS and bypass portions
- Compact design
- Ability to test power switching elements during drawout process
- Power switching devices completely interchangeable between ATS and bypass portions



Magnum Bypass Isolation Front View

Front Access Option 54A is Available on All Magnum Designs

Standards and Certifications

Eaton transfer switch equipment is listed for application by UL and CSA. In addition, Eaton ATSs are listed in File E38116 by Underwriters Laboratories under Standard UL 1008. This standard covers requirements for ATSs intended for use in ordinary locations to provide for lighting and power as follows:

A. In emergency systems, in accordance with Articles 517 and 700 in the National Electrical Code (NEC), American National Standards Institute/National Fire Protection Association (ANSI/NFPA) 70 and the NFPA No. 76A and/or

B. In standby systems, in accordance with Article 702 of the NEC and/or

C. In legally required standby systems in accordance with Article 701 of the NEC. Eaton ATSs are available to meet NFPA 110 for emergency and standby power systems, and NFPA 99 for health-care facilities when ordered with the appropriate options. Since Eaton ATSs utilize specially designed switches and/or switching devices as the main power switching contacts, these devices must also be listed under the additional UL Standard 1066. UL utilizes two basic types of listing programs:

a. Label Service, and

b. Re-examination. UL 1066 employs a label service listing program that requires an extensive follow-up testing program for listed devices. Standard UL 1008 for ATSs lists devices under the re-examination program that only requires a continual physical re-examination of the components used in the product to ensure consistency with the originally submitted device. Follow-up testing IS NOT required by UL 1008. Representative production samples of switches and switching devices used in Eaton ATSs are subjected to a complete test program identical to the originally submitted devices on an ongoing periodic basis per UL 1066. The frequency of such a re-submittal can be as often as every quarter for a low ampere device.

Note: IBC seismic qualified.

Catalog Number Selection

Using the catalog numbering system provides an overview of the ten basic style/feature categories that generate the 15-digit catalog number.

Magnum Bypass, Transfer Switches 200–5000A

BI V I MG E 3 3200 X R U

Type
- **BI** = Bypass open transition
- **CB** = Closed transition/ bypass isolation

Orientation
- **V** = Vertical

Logic
- **I** = ATC-600 (open transition)
- **I** = ATC-800 (closed transition)

Frame
- **MG** = Magnum DS

Switch
- **E** = Drawout, PCS both
- **F** = Drawout, PCB both
- **G** = Drawout, PCB normal, PCS emergency
- **H** = Drawout, PCS normal, PCB emergency

Poles
- **2** = Two-pole
- **3** = Three-pole
- **4** = Four-pole

Amperes

0200 = 200A	**1600** = 1600A
0300 = 300A	**2000** = 2000A
0400 = 400A	**2500** = 2500A
0600 = 600A	**3200** = 3200A
0800 = 800A	**4000** = 4000A
1000 = 1000A	**5000** = 5000A
1200 = 1200A	

Voltage
- **A** = 120V, 60 Hz, three-phase, three-wire
- **B** = 208/120V, 60 Hz, three-phase, four-wire
- **E** = 600V, 60 Hz, three-phase, three-wire
- **E** = 600V, 60 Hz, three-phase, four-wire
- **G** = 220/127V, 50 Hz, three-phase, four-wire
- **H** = 380/220V, 50 Hz, three-phase, four-wire
- **M** = 230V, 50 Hz, three-phase, four-wire
- **M** = 230V, 50 Hz, single-phase, three-wire
- **O** = 415/240V, 50 Hz, three-phase, four-wire
- **W** = 240/120V, 60 Hz, single-phase, three-wire
- **W** = 240V, 60 Hz, three-phase, three-wire
- **W** = 240/120V, 60 Hz, three-phase, four-wire hi-leg
- **W** = 230/115V, 60 Hz, single-phase, three-wire
- **X** = 480V, 60 Hz, three-phase, three-wire
- **X** = 480/277V, 60 Hz, three-phase, four-wire
- **X** = 480/240V, 50 Hz, single-phase, two-wire

Enclosure
- **S** = NEMA 1
- **R** = NEMA 3R
- **T** = Through-door design

Listing
- **U** = UL listed CSA listed

Legend:
PCS = Power Case Switch
PCB = Power Circuit Breaker

Product Selection

Eaton transfer switch equipment offers flexibility and versatility to the system designer and user. All switches include the basic features necessary for normal operation as standard. Eaton also offers an extensive array of optional features/ accessories that allows the user to customize a new transfer switch to match the application. Select the appropriate catalog number for the application. Then choose any optional features/accessories needed to complete the project requirements.

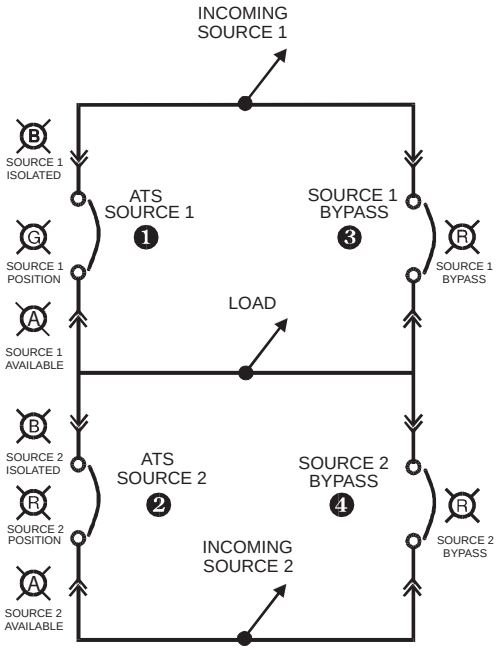
Catalog Number:
BIVIMGE33200XRU

The example above would specify the following:

- Bypass isolation
- Vertical configuration
- ATC-600 controller
- Magnum DS frame
- Power case switch normal and emergency
- Drawout
- Three-pole
- 3200A
- 480V
- NEMA 3R enclosure
- UL listed

Technical Data and Specifications

Typical Bypass Isolation Switch Schematic



Withstand Ratings

Rating When Used with Upstream Circuit Breaker		Rating When Used with Upstream Fuse
Transfer Switch Ampere Rating	3-Cycle 600V (kA)	30-Cycle 600V (kA)
200	100	85
1000	100	85
1200	100	85
1600	100	85
2000	100	85
2500	100	85
3200	100	85
4000	100	85
5000	100	85

- Tested in accordance with UL 1008
- Eaton drawout Magnum transfer switch will coordinate with a power switching device short-time rating
- Contact factory for details

Dimensions

Approximate Dimensions in Inches (mm)

Magnum Drawout Transfer Switches

Automatic and Non-Automatic Transfer Switches

Enclosures meet all current applicable NEMA and UL standards for conduit entry, cable bending, gutter space and shielding of live components.

NEMA 1 and NEMA 3R Enclosures

Magnum transfer switches are supplied with a front door only. They can be mounted in a corner or against a wall. Access to cable space can be via either side, bottom, top or the rear.

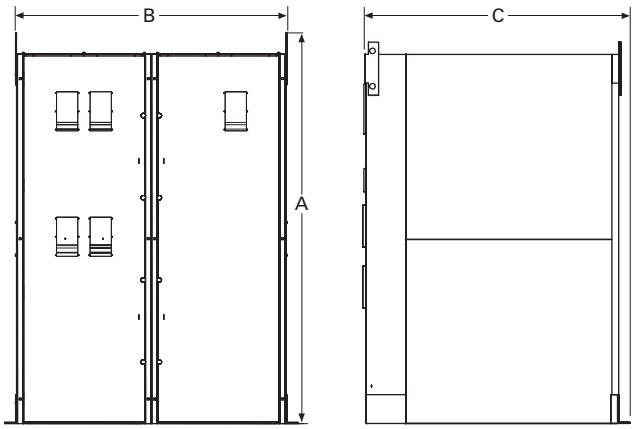
Note: Add 3.00 inches (76.2 mm) to the height, 6.00 inches (152.4 mm) to the width and 3.00 inches (76.2 mm) to the depth to all enclosure dimensions to account for the seismic mounting brackets.

Approximate Dimensions in Inches (mm)

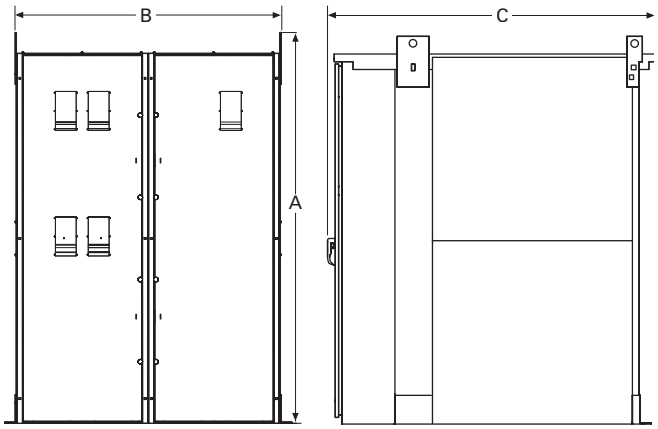
Magnum Bypass Isolation Drawout Transfer Switches

Ampere Rating	Number of Poles	A Height	B Width	C Depth	Shipping Weight Lbs (kg)
NEMA 1 Enclosed Drawout Transfer Switch					
200–2000	2	90.00 (2286.0)	64.00 (1625.6)	60.00 (1524.0)	3100 (1409)
200–2000	3	90.00 (2286.0)	64.00 (1625.6)	60.00 (1524.0)	3100 (1409)
200–2000	4	90.00 (2286.0)	64.00 (1625.6)	60.00 (1524.0)	3700 (1682)
2500–3200	2	90.00 (2286.0)	64.00 (1625.6)	60.00 (1524.0)	4700 (2136)
2500–3200	3	90.00 (2286.0)	64.00 (1625.6)	60.00 (1524.0)	4700 (2136)
2500–3200	4	90.00 (2286.0)	64.00 (1625.6)	60.00 (1524.0)	5500 (2500)
NEMA 3R Enclosed Drawout Transfer Switch					
200–2000	2	90.00 (2286.0)	64.00 (1625.6)	75.00 (1905.0)	3700 (1682)
200–2000	3	90.00 (2286.0)	64.00 (1625.6)	75.00 (1905.0)	3700 (1682)
200–2000	4	90.00 (2286.0)	64.00 (1625.6)	75.00 (1905.0)	4300 (1955)
2500–3200	2	90.00 (2286.0)	64.00 (1625.6)	75.00 (1905.0)	5300 (2410)
2500–3200	3	90.00 (2286.0)	64.00 (1625.6)	75.00 (1905.0)	5300 (2410)
2500–3200	4	90.00 (2286.0)	64.00 (1625.6)	75.00 (1905.0)	6000 (2730)

200–3200A Drawout NEMA 1



200–3200A Drawout NEMA 3R



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Approximate Dimensions in Inches (mm)

Magnum Bypass Isolation Drawout Transfer Switches

Ampere Rating	Number of Poles	A Height	B Width	C Depth	Shipping Weight Lbs (kg)
NEMA 1 Enclosed Drawout Transfer Switch					
4000	2 or 3	90.00 (2286.0)	137.00 (3479.8)	60.00 (1524.0)	①
4000	4	90.00 (2286.0)	137.00 (3479.8)	60.00 (1524.0)	①
5000	2 or 3	①	①	①	①
5000	4	①	①	①	①
NEMA 3R Enclosed Drawout Transfer Switch					
4000	2 or 3	①	①	①	①
4000	4	①	①	①	①
5000	2 or 3	①	①	①	①
5000	4	①	①	①	①

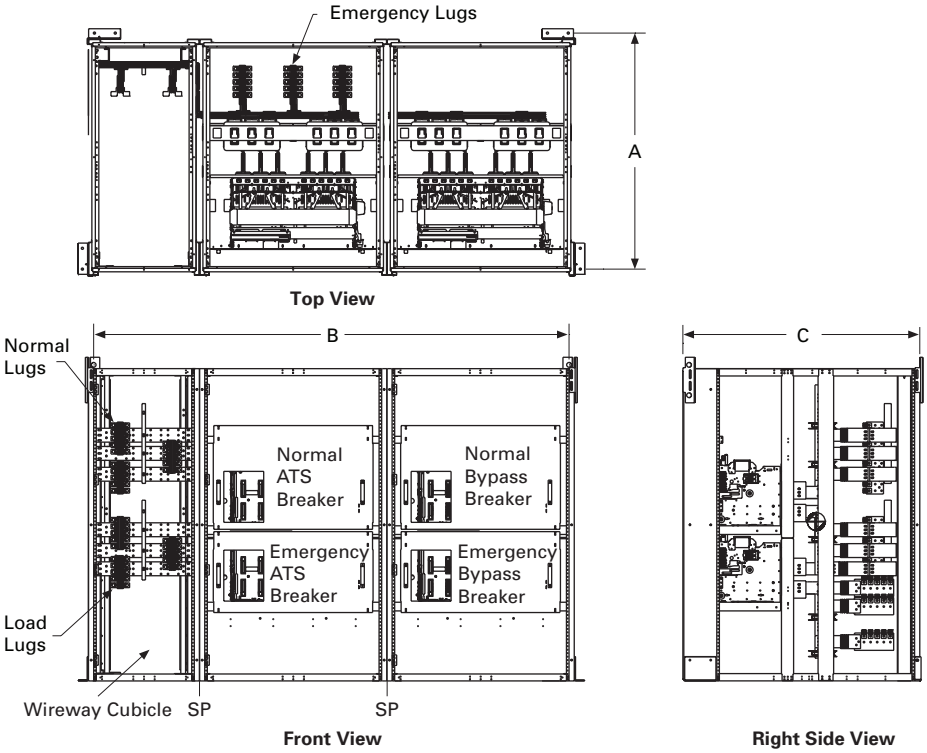
Wireway Dimensions

Ampere Rating	Number of Poles	A Height	B Width	C Depth	Shipping Weight Lbs (kg)
4000	3	90.00 (2286.0)	38.00 (965.2)	48.00 (1219.2)	900 (408)
4000	4	90.00 (2286.0)	38.00 (965.2)	48.00 (1219.2)	1050 (476)
5000	3	90.00 (2286.0)	38.00 (965.2)	60.00 (1524.0)	1100 (498)
5000	4	90.00 (2286.0)	38.00 (965.2)	60.00 (1524.0)	1250 (566)

Connection Type (4000–5000A Only) ②

Connection Type			
Line	**Emergency**	**Load**	**Wireway**
Cable	Cable	Cable	Yes
Bus	Cable	Cable	Yes
Cable	Bus	Cable	Yes
Cable	Cable	Bus	Yes
Bus	Bus	Cable	No
Bus	Cable	Bus	No
Cable	Bus	Bus	No
Bus	Bus	Bus	No

Magnum 4000–5000A Units



Note: The 4000 and 5000A bypass isolation ATS will include two cubicles for the Source 1 and Source 2 Normal and the Bypass power case switch. An additional cubicle called a wireway is provided for the Normal and Load connections. The wireway cubicle will have removable panels on the front, and cable connections may be made from the top or the bottom. Cable connections for Emergency are made in the rear. The wireway width is 32.00 inches (812.8 mm).

SP = Shipping Split.
Consult factory for dimensions.

Notes

① Consult factory.

② A wireway is required in accordance with the following table for 4000 and 5000A ratings.

Magnum Closed Transition Soft Load Transfer Switch with ATC-5000 Controller

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Magnum Closed Transition Soft Load Transfer Switches with ATC-5000 Controller

Product Description

Electrical power generation located at or near the point of its consumption, commonly referred to as distributed generation, has seen tremendous growth recently due to factors such as limited utility grid generation and transmission capacity combined with the onset of utility deregulation. Strong economic incentives now exist for many users to consider on-site self-generation for both improved power reliability and energy cost reduction. Additionally, these opportunities have spurred the development of new and unique types of generating and switching technologies.

Eaton closed transition soft load automatic transfer switches are just such a technology. Closed transition soft load transfer switches are an ideal solution for power availability, energy management and generator-set exercising applications. Unlike traditional open transition switches that provide a break-before-make operation, the closed transition soft load switch allows two power sources, usually the utility and a generator set, to be paralleled indefinitely. This permits the load, inductive or resistive, to be gradually and seamlessly transferred from one source to another. All of this is accomplished through the make-before-break operation of the switch with no power interruption to the load.

Eaton closed transition soft load switch utilizes an integrated micro-processor-based power controller to make active paralleling of two power sources possible. It manages the speed governor and voltage regulator of the generator set to bring the two sources into synchronization. This approach allows the transfer switch to be applied in soft load transfer applications. In addition, it can also be used as a peak shaving switch helping customers to reduce their peak demand charges by paralleling the generator set with the utility source during times of high electrical demand.

Standard fixed drawout or drawout bypass isolation configurations are available with or without an integral service entrance rating. If a switch with a service entrance rating is used as service entrance equipment, the need for separate service disconnects and overcurrent protective devices is eliminated.

Eaton closed transition soft load automatic transfer switches are available for 800 through 3200A, up to 600 Vac, 50 or 60 Hz applications worldwide. They are offered in both indoor (NEMA 1) and outdoor (NEMA 3R) free-standing enclosures utilizing drawout or fixed insulated case Magnum DS switching devices. The Magnum DS switching device is a 100% rated device with a 100 kA interrupting capability at 600 Vac.

Application Description

Power reliability and power costs are two issues of strategic importance in almost all industry segments. Businesses have critical processes that cannot tolerate a shutdown, while an extended failure in many cases could cause unrecoverable losses. In addition, significant changes in the utility industry have created on-site generation opportunities for customers to address their power reliability and energy cost concerns. This type of on-site power generation at or near the point of consumption is known as distributed generation. Market studies estimate that over 40% of generation capacity added in the United States alone over the next 10 years will be distributed. A key enabler of these on-site generation systems and reliable power in general is often a closed transition soft load transfer switch.

Typical applications for Eaton closed transition soft load automatic transfer switches include industrial processes, data centers and critical care facilities. Any location with critical loads where the absence of power could result in lost revenue, production time or personal injury should make this equipment a prime consideration.

Consider Several Specific Applications

- A facility with emergency or critical power systems wanting to test their generator sets without a power interruption
- Any industrial, institutional or commercial business seeking ways to lower energy costs by reducing demand charges, which can represent over 50% of an electrical bill
- Energy service companies interested in offering performance-based solutions to their customer base
- Electrical power providers interested in offering power reliability solutions to their customer base in return for long-term electrical contracts

The Eaton closed transition soft load automatic transfer switch can be applied in new installations or as a retrofit to replace an existing open transition transfer switch. A number of application issues should be reviewed. First, since most generator sets run on diesel fuel, there are exhaust emission concerns to consider. In some markets, the Environmental Protection Agency (EPA) limits the number of hours annually that a generator set can be operated. Methods to deal with such restrictions, should they present a problem, are the use of natural gas or dual fuel (natural gas/diesel mixture) types of generator sets. A second issue relates to electrical utility interconnection standards. Many utility companies require multiple levels of protective relaying when a user wishes to parallel to the utility grid. The cost of meeting some of these specifications can be high. These issues should be discussed when peak shaving is being considered.

Features, Benefits and Functions

Sequence of Operations

Automatic Mode Operation—Transfer Switch Loss of Normal Power
The system will continuously monitor the condition of the normal power supply. When the voltage or frequency of the normal source is sensed outside the user-adjustable set points, and after an adjustable time delay to override momentary dips and/or outages, a contact shall close to initiate a starting of the emergency or standby source. Transfer to the alternate source shall take place upon attainment of adjustable pickup voltage and frequency of the alternate source.

Return of Normal Power—Breaker Open Transition Logic Selected
When normal source has been restored and is within the preselected ranges for voltage and frequency and after a time delay to ensure the integrity of the normal power source, the load shall be transferred back to normal source in a break-before-make transfer scheme. The generator set will continue to run for a user-adjustable time to allow the generator set to run unloaded for cool down, after which the engine will be shut down. Upon completion, the system will then be ready for automatic operation.

Return of Normal Power—Breaker Closed Transition Logic Selected
When the normal source has been restored and is within the preselected ranges for voltage and frequency, and after an adjustable time delay to ensure the integrity of the normal source, the load shall be transferred back to the normal source in a make-before-brake transfer scheme.

On completion of the time delay, the generator-set bus will automatically synchronize with the utility service across the Source 1 (normal) breaker. When the two systems are synchronized, the Source 1 (normal) breaker will close and the Source 2 (emergency) breaker will open. The generator set will continue to run for a user-adjustable time to allow the generator set to run unloaded for cool down, after which the engine will be shut down. Upon completion, the system will then be ready for automatic operation.

Return of Normal—Breaker Interchange (Soft Load) Logic Selected
When the normal source has been restored and is within the preselected ranges for voltage and frequency, and after an adjustable time delay to ensure the integrity of the normal source, the load shall be transferred back to the normal source in a make-before-brake transfer scheme. On completion of the time delay, the generator-set bus will automatically synchronize with the utility service across the Source 1 (normal) breaker. When the two systems are synchronized, the Source 1 (normal) breaker will close and the generator set will gradually transfer all loads to the utility.

On completion of the load transfer sequence the Source 2 (emergency) breaker will open. The generator set will continue to run for a user-adjustable time to allow the generator set to run unloaded for cool down, after which the engine will be shut down. Upon completion, the system will then be ready for automatic operation.

Peak Shaving
The closed transition soft load transfer switch can be factory configured to automatically parallel to the utility. In this operation mode, the switch will be paralleled with the utility when the user-adjustable load power level is exceeded for the predetermined amount of time.

Test Mode Operation

Engine Run Test Mode
To perform an engine run test, first place the System Test switch in the "Run" position. Next place the Auto/Test switch in the "Test" position. The engine start contact will close, the engine will start and the generator will produce nominal voltage and frequency.

Neither Source 1 nor Source 2 breaker will be operated.

Returning either the System Test to "Off" position or Auto/Test switch to "Auto" position will remove the "Engine Start" command. The engine will shut down.

Transfer Test Mode (Open Transfer)

Note: This operation is carried out when the controller's breaker logic is programmed for open transition via ATC-5000 Input 64.

To perform an open transition test, first place the Test Mode selector switch in the "Mode 1" position, followed by placing the System Test switch in "Test" position, followed by placing Auto/Test selector switch in the "Test" position. After an adjustable time delay, the generator will start. After the nominal voltage and frequency are reached, the Source 1 (normal) breaker will open and the Source 2 (emergency) breaker will close on the dead bus.

Returning either the Auto/Test selector switch to "Auto" position or the Test Mode selector switch to "Off" position will cause the system to return to normal power as described in "Return Of Normal Power—Breaker Open Transition Logic Selected."

Transfer Test Mode (Closed Transition)

Note: This operation is carried out when the controller's breaker logic is changed to closed transfer via ATC-5000 Input 64.

To perform a closed transition test, first place the Test Mode selector switch in the "Mode 2" position, followed by placing the System Test switch in "Test" position, followed by placing the Auto/Test selector switch in the "Test" position. After an adjustable time delay, the generator will start. After the nominal voltage and frequency are reached, the generator bus will be synchronized to the utility across the Source 2 (emergency) breaker. When the two sources are synchronized the Source 2 (emergency) breaker closes and then Source 1 (normal) breaker opens.

Returning either the Auto/Test selector switch to "Auto" position or the System Test selector switch to "Off" position will cause the system to return to normal power as described in "Return Of Normal Power—Breaker Closed Transition Logic Selected."

Transfer Test Mode (Interchange—Soft Load Transition)

Note: This operation is carried out when the controller's breaker logic is programmed for interchange (soft load transition).

To perform an interchange (soft load transition) test, first place the Test Mode selector switch in the "Mode 1" position, followed by placing the System Test switch in "Test" position, followed by placing the Auto/Test selector switch in the "Test" position. After an adjustable time delay, the generator will start. After the nominal voltage and frequency are reached, the generator bus will be synchronized to the utility across the Source 2 (emergency) breaker. When the two sources are synchronized, the Source 2 (emergency) breaker is closed, and the generator gradually assumes all load. On completion of the load transfer sequence, the Source 1 (normal) breaker will open.

Returning either the Auto/Test selector switch to "Auto" position or the System Test selector switch to "Off" position will cause the system to return to normal power as described in "Return of Normal Power (Switch in Closed Transition Mode)."

Paralleling Test Mode (Baseload)

Note: This operation is carried out when the controller's Breaker Logic is changed to Parallel via ATC-5000 Input 64 and the Baseload operation is selected.

To perform a paralleling test in a base load mode, first place the Test Mode selector switch in the "Mode 2" position, followed by placing the System Test switch in "Test" position, followed by placing the Auto/Test selector switch in the "Test" position. After an adjustable time delay, the generator will start. After the nominal voltage and frequency are reached, the generator bus will be synchronized to the utility across the Source 2 (emergency) breaker. When the two sources are synchronized, the Source 2 (emergency) breaker is closed and the generator gradually assumes load up to the user-programmable power level and then continuously maintains its power output.

Returning either the Auto/Test selector switch to "Auto" position or the System Test selector switch to "Off" position will cause the generator to gradually unload, and then the Source 2 (emergency) breaker will open. The generator set will continue to run for a user-adjustable time, allowing the generator set to run unloaded for cool down, after which the engine will be shut down. Upon completion, the system will then be ready for automatic operation.

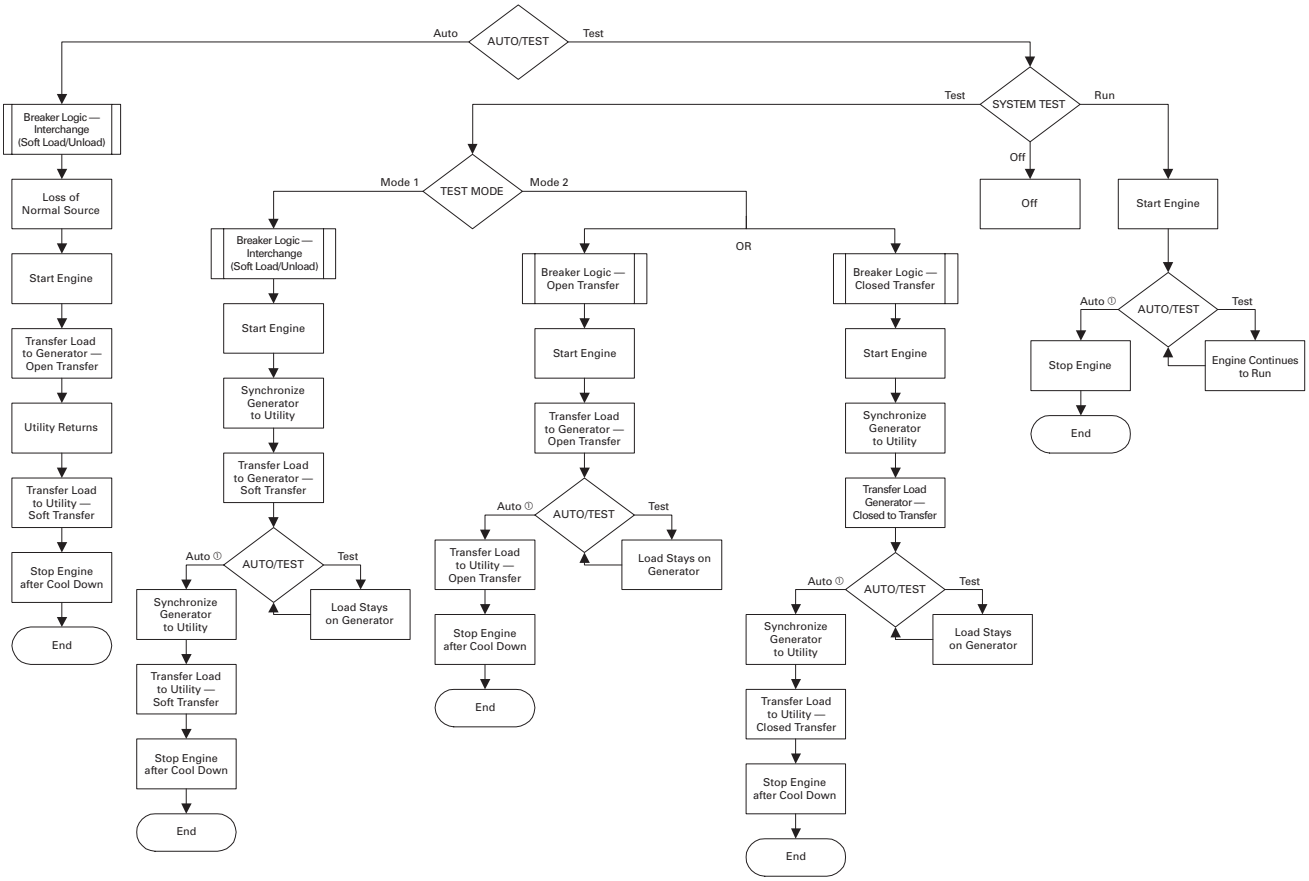
Paralleling Test Mode (Import/Export)

Note: This operation is carried out when the controller's Breaker Logic is changed to Parallel via ATC-5000 Input 64 and the Import/Export operation is selected.

To perform a paralleling test in Import/Export mode, first place the Test Mode selector switch in the "Mode 2" position, followed by placing the System Test switch in "Test" position, followed by placing the Auto/Test selector switch in the "Test" position. After an adjustable time delay, the generator will start. After the nominal voltage and frequency are reached, the generator bus will be synchronized to the utility across the Source 2 (emergency) breaker. When the two sources are synchronized, the Source 2 (emergency) breaker is closed, and the generator gradually assumes load up to the "user-programmable import (adjustable power setting for power supplied from the utility) or export (adjustable power setting for power supplied to the utility) power level and then continuously varies its power output to maintain the selected power flow.

Returning either the Auto/Test selector switch to "Auto" position or the System Test selector switch to "Off" position will cause the generator to gradually unload and then the Source 2 (emergency) breaker will open. The generator set will continue to run for a user-adjustable time, allowing the generator set to run unloaded for cool down, after which the engine will be shut down. Upon completion, the system will then be ready for automatic operation.

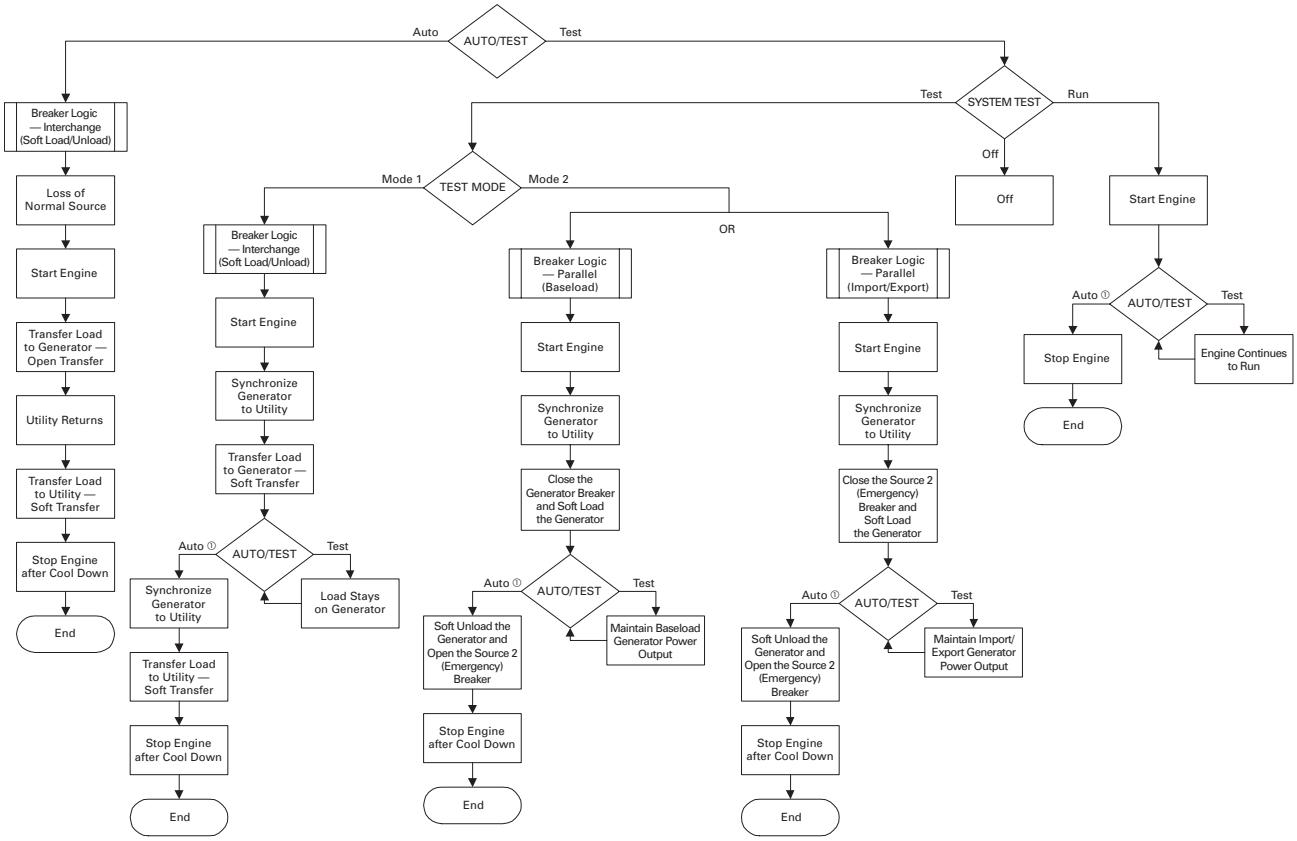
Sequence Flow Chart—Soft Load ATS



Note

① Or switch SYSTEM TEST selector switch to OFF.

Sequence Flow Chart—Soft Load ATS with Extended Paralleling Capabilities



Note

① Or switch SYSTEM TEST selector switch to OFF.

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Catalog Number Selection

Using the Catalog Numbering System provides an overview of the 10 basic style/feature categories which generate the 15-digit catalog number.

Transfer Switch—Magnum Soft Load Transfer Switches 800–3200A

CT V C MG E 3 2000 X R U

Type
CT = Closed transition

Orientation
V = Vertical

Logic
C = ATC-5000

Frame
MG = Molded cases Magnum DS

Switch
A = Fixed mount, power case switch PCS both
B = Fixed mount, power case circuit breaker PCB both
C = Fixed mount, pcb normal, PCS emergency
D = Fixed mount, PCS normal, PCB emergency
E = Drawout, PCS both
F = Drawout, PCB both
G = Drawout, PCB normal, PCS emergency
H = Drawout, PCS normal, PCB emergency

Poles
3 = Three-pole
4 = Four-pole

Amperes
0800 = 800A
1000 = 1000A
1200 = 1200A
1600 = 1600A
2000 = 2000A
2500 = 2500A
3200 = 3200A

Voltage
A = 120V, 60 Hz, three-phase, three-wire
B = 208/120V, 60 Hz, three-phase, four-wire
E = 600V, 60 Hz, three-phase, three-wire
E = 600V, 60 Hz, three-phase, four-wire
G = 220/127V, 50 Hz, three-phase, four-wire
G = 220/110V, 50/60 Hz, single-phase, three-wire
H = 380/220V, 50 Hz, three-phase, four-wire
K = 600V, 50 Hz, three-phase, four-wire
M = 230V, 50 Hz, three-phase, three-wire
M = 230V, 50 Hz, single-phase, three-wire
N = 401/230V, 50 Hz, three-phase, four-wire
O = 415/240V, 50 Hz, three-phase, four-wire
W = 240/120V, 60 Hz, single-phase, three-wire
W = 240V, 60 Hz, three-phase, three-wire
W = 240/120V, 60 Hz, three-phase, four-wire hi-leg
W = 230/115V, 60 Hz, single-phase, three-wire
X = 480V, 60 Hz, three-phase, three-wire
X = 480/277V, 60 Hz, three-phase, four-wire
X = 480/240V, 50 Hz, single-phase, two-wire
Z = 346/220V, 50 Hz, three-phase, four-wire

Enclosure
S = NEMA 1
R = NEMA 3R

Listing
U = UL listed

PCS = Power Case Switch
PCB = Power Circuit Breaker

16

Product Selection

Transfer Switch Catalog Number Identification

Transfer switch equipment catalog numbers provide a significant amount of relevant information that pertains to a particular piece of equipment. The catalog number identification table provides the required interpretation information. An example for an open transition switch is offered to initially simplify the process.

Example: Catalog number (circled numbers correspond to position headings in the table below.

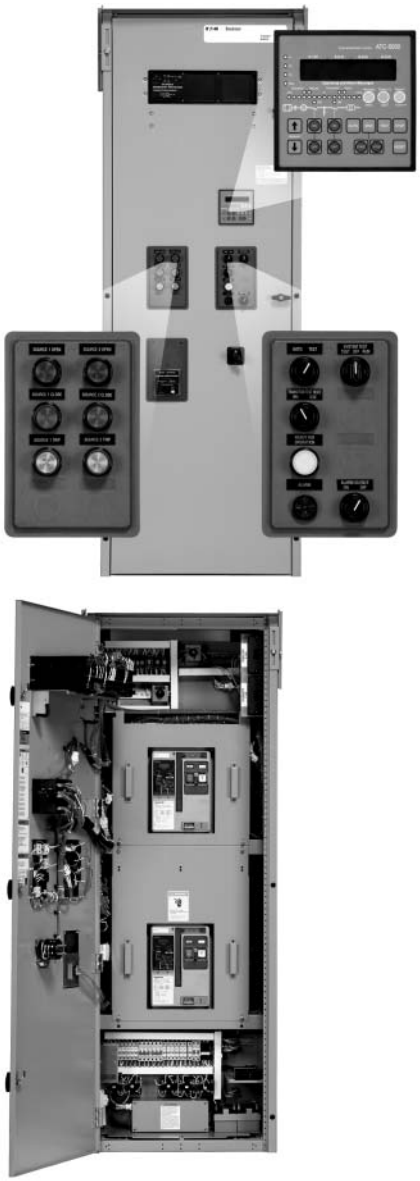
③	④	⑤ to ⑥	⑦	⑧	⑨ to ⑫	⑬
V	C	MG	E	3	2000	X

The catalog number CTVCMGE32000XRU describes a Soft Load ATS with the drawout switching devices mounted vertically in the enclosure. The intelligence, represented by the ATC-5000, is a microprocessor-based logic package.

The Magnum breaker is used as the switching device and is a three-pole molded case breaker for each source.

The continuous current rating of this equipment is 2000A and is applicable at 480/277 Vac, 60 Hz. The transfer switch equipment is enclosed in a NEMA 3R enclosure and is listed for Underwriters Laboratories (UL).

Base Components



Magnum Soft Load ATS Base Components

Enclosure

The rugged steel switch enclosure is supplied with four door hinges, regardless of enclosure size, to ensure proper support of the door and door-mounted devices. The hinges have removable hinge pins to facilitate door removal. The doors are supplied as standard with thumbscrew and padlock latches. Cable entry holes are the customer's responsibility.

The door is used to mount a variety of lights, switches and pushbuttons, depending upon the options required for a particular switch. All switch doors are supplied with a heavy-duty plastic accessory panel in place, whether or not external devices are required. When lights, pushbuttons or switches are required, they are normally mounted in the plastic door-mounted panel.

Transfer switch enclosures and some internal steel mounting plates, such as the transformer panel mounting plate, go through a pretreatment cleaning system prior to painting to ensure a durable finish. Should the enclosure become scratched and in need of touch-up paint, use ANSI 61. All remaining steel is galvanized.

The standard switch enclosure is NEMA Type 1 for general indoor use. See table below.

Power Cables

Power cables are to be connected to solderless screw-type lugs located on the transfer switch switching devices. Refer to the separate customer wiring diagrams supplied with the transfer switch equipment for power termination. Verify that the lugs supplied will accommodate the power cables being used. Also verify that the cables comply with local electrical codes. Standard transfer switch equipment, as supplied from the factory, will accommodate the wire sizes shown in table below.

Transfer Switch Equipment Enclosures

NEMA Type	Design	Protection
1	Indoor	Enclosed equipment
3R	Outdoor	Rain, ice formation

Wire Size for Available Power Cable Connections

Device	Switch Ampere Rating	Cables Per Phase	Range Wiring Size
Switch	800–2000	6	3/0–750 kcmil
	2500–3200	9	3/0–750 kcmil
Neutral	800–2000	24	4/0–500 kcmil
	2500–3200	36	4/0–500 kcmil

Technical Data and Specifications

System

Standards

Eaton Soft Load ATSs are listed in File E38116 by Underwriters Laboratories, under Standard UL 1008. This standard covers requirements for ATSs intended for use in ordinary locations to provide for lighting and power as follows:

A. In emergency systems, in accordance with articles 517 and 700 in the National Electrical Code (NEC), American National Standards Institute/ National Fire Protection Association (ANSI/NFPA) 70 and the NFPA No. 76A.

B. In stand-by systems, in accordance with article 702 of the NEC.

C. In legally required standby systems in accordance with article 701 of the NEC.

Eaton ATSs are available to meet NFPA 110 for emergency and standby power systems, and NFPA 99 for health-care facilities when ordered with the appropriate options.

Since Eaton ATSs utilize specially designed switches and/or switching devices as the main power switching contacts, these devices must also be listed under the additional UL Standard 1066. UL utilizes two basic types of listing programs: a) Label Service and b) Re-examination. UL 1066 employs a label service listing program that requires an extensive follow-up testing program for listed devices. Standard UL 1008 for ATSs lists devices under the re-examination program that only requires a continual physical re-examination of the components used in the product to ensure consistency with the originally submitted device. Follow-up testing IS NOT required by UL 1008.

Representative production samples of switches and switching devices used in Eaton ATSs are subjected to a complete test program identical to the originally submitted devices on an ongoing periodic basis per UL 1066.

The frequency of such a resubmittal can be as often as every quarter for a low ampere device.

Environmental

Seismic

With proper installation, and by including Option 42, which includes specially designed cleats, the Magnum transfer switch is a Seismic-Certified Transfer Switch with certificate for application that is Seismic Zone 4 under the California Building Code, the Uniform Building Code, and BOCA.

Operational Conditions

Normal operation of ATSs in an electrical equipment room for indoor applications. Outdoor applications can subject units to falling rain, freezing temperatures and 95% humidity (noncondensing).

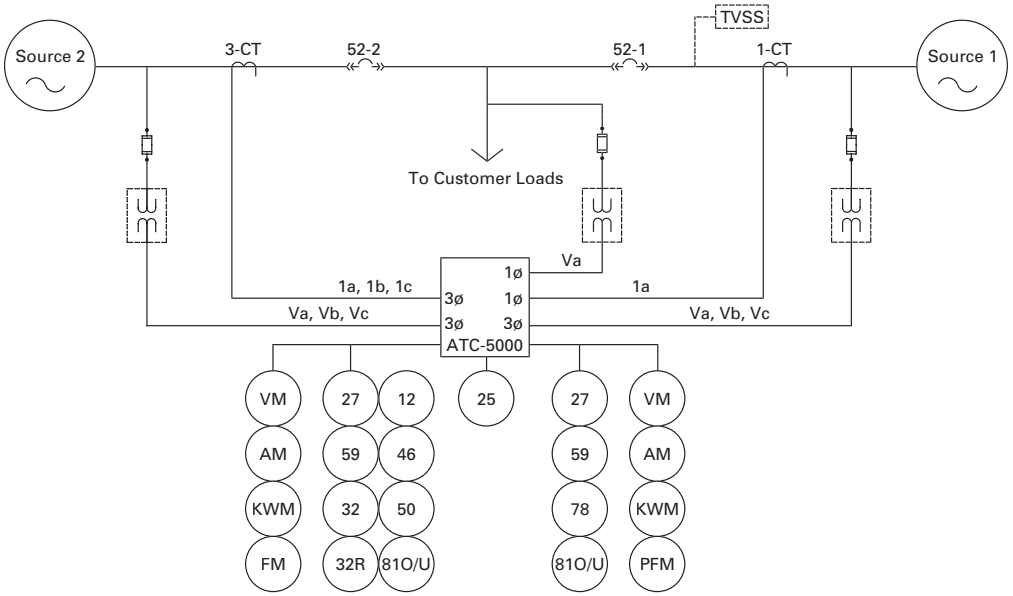
Ambient temperature for operation is between –20 and +65°C (–4 and 149°F).

System Ratings—Magnum DS Fixed and Drawout

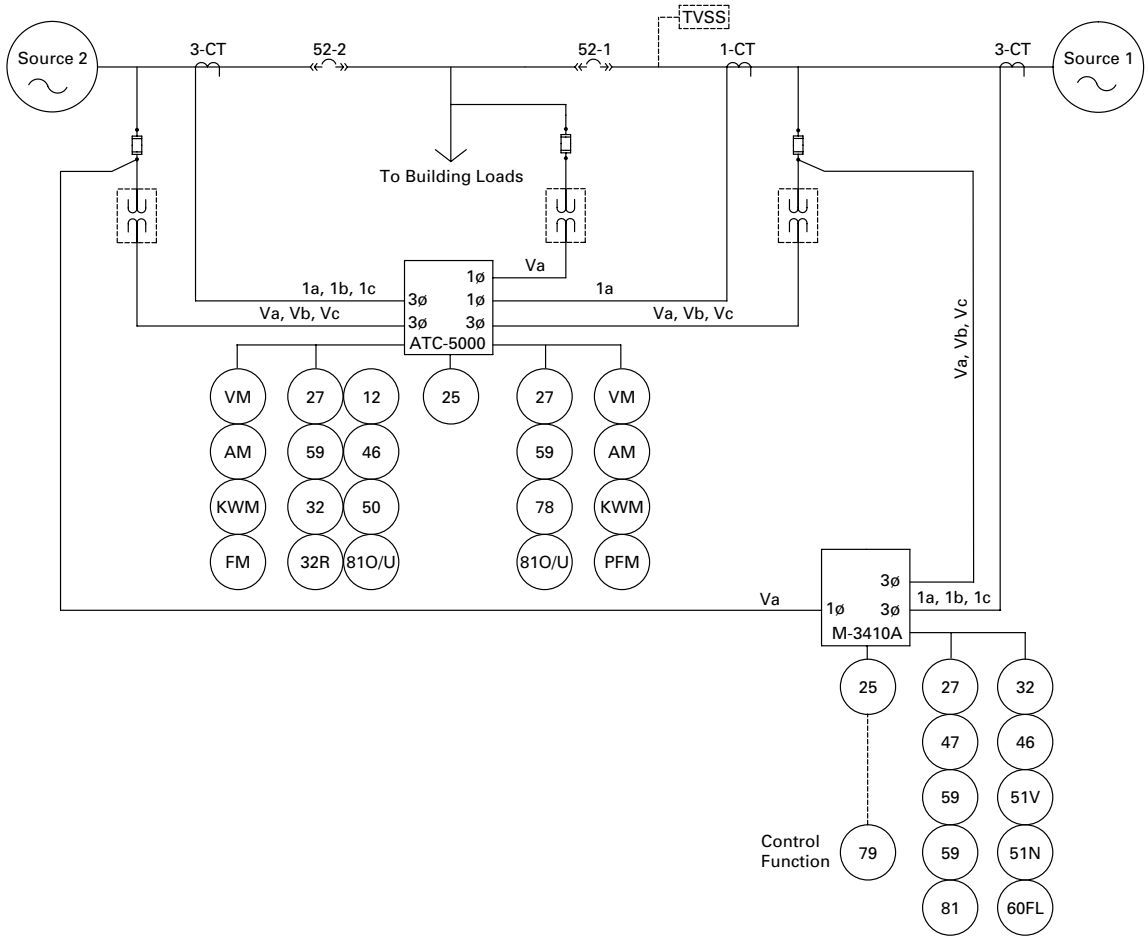
Standard UL 1008 3-Cycle		30-Cycle Extended Rating
ATS Ampere Rating	Ratings when used with Upstream Breaker (kA) 120–600 Vac	Ratings used for Coordination with Upstream Breakers with Short-Time Rating 120–600 Vac
800	100	85
1000	100	85
1200	100	85
1600	100	85
2000	100	85
2500	100	85
3200	100	85

Wiring Diagrams

Typical System Diagram—Standard One Line



Typical System Diagram—Standard One Line With Utility Grade Multifunction Relaying



Dimensions

Approximate Dimensions in Inches (mm)

Enclosure Chart

			NEMA 1			NEMA 3R		
Design	**Amperes**	**Poles**	**Height**	**Width**	**Depth**	**Height**	**Width**	**Depth**
Fixed	800–2000	3 & 4	90.00 (2286.0)	32.00 (812.8)	48.00 (1219.2)	90.00 (2286.0)	32.00 (812.8)	54.00 (1371.6)
	2500–3200	3 & 4	90.00 (2286.0)	44.00 (1117.6)	48.00 (1219.2)	90.00 (2286.0)	44.00 (1117.6)	54.00 (1371.6)
Drawout	800–2000	3 & 4	90.00 (2286.0)	32.00 (812.8)	60.00 (1524.0)	90.00 (2286.0)	32.00 (812.8)	66.00 (1676.4)
	2500–3200	3 & 4	90.00 (2286.0)	44.00 (1117.6)	60.00 (1524.0)	90.00 (2286.0)	44.00 (1117.6)	66.00 (1676.4)
Fixed with bypass isolation	800–2000	3 & 4	90.00 (2286.0)	64.00 (1625.6)	48.00 (1219.2)	90.00 (2286.0)	64.00 (1625.6)	54.00 (1371.6)
	2500–3200	3 & 4	90.00 (2286.0)	88.00 (2235.2)	48.00 (1219.2)	90.00 (2286.0)	88.00 (2235.2)	54.00 (1371.6)
Drawout with bypass isolation	800–2000	3 & 4	90.00 (2286.0)	64.00 (1625.6)	60.00 (1524.0)	90.00 (2286.0)	64.00 (1625.6)	66.00 (1676.4)
	2500–3200	3 & 4	90.00 (2286.0)	88.00 (2235.2)	60.00 (1524.0)	90.00 (2286.0)	88.00 (2235.2)	66.00 (1676.4)

ATC-5000 Integrated Microprocessor Controller

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Magnum Closed Transition Soft Load Transfer Switches with ATC-5000 Controller	**57**
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ATC-5000 Specifications

Product Description

The integrated logic controller is a microprocessor-based generator set control and management package. ATC-5000 provides a user-friendly interface allowing operators to easily view system status, view and reset alarms, display metered values and modify device set points.

The unit provides fully integrated communication to engine Electronic Control Units (ECUs) including:

- [via CAN bus] standard SAE J1939, Deutz EMR, Scania S6, mtu MDEC
- [via RS-232] Caterpillar CCM to EMCP-II, and ECM

Features

- Integrated LED display
- Automatic transfer switch logic
- True rms sensing
- Frequency and voltage bias outputs for the generator sets
- Protective relays
  - Device 25A synchronizer
  - Device 59/27 O/U voltage for generator set and utility tie
  - Device 81 O/U frequency for generator set and utility tie
  - Device 78 phase/vector shift for the utility tie
  - Device 32/32R overload/ reverse power for the generator set
  - Device 46 load imbalance for the generator set
  - Device 50/51 overcurrent for the generator set
- Load management
  - Automatic base load/ peak shaving
  - Import/export power control
- Automatic start/stop sequencing for gas and diesel engines
- Load dependent start/stop
- Real power/PF control
- Counters for kWh, engine starts, operating hours and maintenance call
- Freely configurable discrete and analog alarm inputs
- Freely configurable relay and analog outputs
- Language manager
- Event logging
- PC and front panel configurable
- Multi-level password protection
- Battery voltage monitoring
- CANbus communication

Standards and Certifications

- UL/cUL® listed (voltages up to 300 Vac)

UL Listed

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Technical Data and Specifications

- Accuracy—Class 1
- Power supply—12/24 Vdc (9.5 to 32 Vdc)
- Intrinsic consumption—maximum 20W
- Ambient temperature—–20 to 70°C
- Ambient humidity—95%, noncondensing
- Voltage rated (Vrated)—[1] 69/120 Vac or [4] 231/400 Vac
  - UL—[1] maximum 86/150 Vac or [4] maximum 173/300 Vac
  - Setting range (sec.) star—[1] 50 to 125 Vac or [4] 50 to 480 Vac
  - Setting range (sec.) delta—[1] 50 to 114 Vac or [4] 50 to 380 Vac
  - Setting range (prim.)—0.050 to 65,000 kVac
  - Measuring frequency—50/60 Hz (40 to 70 Hz)
  - Linear measuring range up to—1.3 x Vrated
  - Input resistance—[1] 0.21 MW, [4] 0.7 MW
  - Maximum power consumption per path —<0.15 W
  - Current (rated values; Irated)—[../1]../1A or [../5]../5A
  - Current-carrying capacity—Igen = 3.0 x Irated
  - Imains = 1.5 x Irated
  - Load—<0.15 VA
  - Related short-time current (1s)—[../1] 50 x Irated, [../5] 10 x Irated
- Discrete inputs—isolated
  - Input range—12/24 Vdc (6 to 32 Vdc)
  - Input resistance—approx. 6.8 kW
- Analog inputs—freely scalable
  - Type—0/4 to 20 mA, Pt100, VDO
  - Resolution—10 Bit
  - Relay outputs—potential free
  - Contact material—AgCdO
  - Load (GP)—2.00 Aac at 250 Vac 2.00 Adc at 24 Vdc/ 0.36 Adc at 125 Vdc/ 0.18 Adc at 250 Vdc
  - Pilot duty (PD)—B300 1.00 Adc at 24 Vdc/0.22 Adc at 125 Vdc/ 0.10 Adc at 250 Vdc
- Analog outputs—Isolated
  - Type—0/4 to 20 mA, freely scalable
  - Resolution—8/12 Bit (depending on model)
  - Maximum load 0/4–20 mA—500 W
  - Insulating voltage—1500 Vdc
- Housing—Type APRANORM DIN 43 700
  - Dimensions—144 x 144 x 118 mm
  - Front cutout—138 [+1.0] x 138 [+1.0] mm
  - Connection—screw/plug terminals depending on connector 1.5 mm^2 or 2.5 mm^2
  - Front—insulating surface
- Protection system—with proper installation
  - Front—IP42 (sealed IP45; gasket kit = P/N 8923-1039)
  - Back—IP21
  - Weight—depending on version, approx. 1000g
- Disturbance test (CE)—tested according to applicable
  - EN guidelines

Protective Relaying

Protective Relay

For paralleling (including soft loading/unloading) applications, utility-grade protective relaying is optional, and offered when utility interconnection standard requires additional protection on top of that provided by ATC-5000 controller. The following protective relays can be included in Eaton Soft Load ATS:

- Beckwith M-3410A—see **Appendix B** for details
- Beckwith M-3520
- Schweitzer SEL-351
- Schweitzer SEL-547
- Basler BE1-951
- Basler BE1-IPS100

All the previously listed protective relays provide protection necessary to satisfy IEEE P1547 standard "IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems." See table below.

Protective Relays

				Utility Intertie Protection					
ANSI/IEEE Number	**Function**	**ATC-5000**	**Eaton Digitrip (Optional)**	**Beckwith M-3410A (Optional)**	**Beckwith M-3520 (Optional)**	**Schweitzer SEL-547 (Optional)**	**Schweitzer SEL-351 (Optional)**	**Basler BE1-951 (Optional)**	**Basler BE1-IPS100 (Optional)**
21	Phase distance				O				
24	Overexcitation V/Hz							S	S
25	Synchronizer	S							
	Synch check			S	S	S	S	S	S
27	Undervoltage	S ①②		S	S	S	S	S	S
27G	Ground undervoltage			S	O				
32	Reverse/forward power	S ①		S	S	S	S	S	S
40	Loss-of-field			S					
46	Negative sequence overcurrent	S ①		S	S				
47	Negative sequence overvoltage			S	S	S		S	S
50	Instantaneous phase overcurrent	S ①	S ①②		S		S	S	S
50N	Instantaneous ground overcurrent		O ①②		S		S	S	S
51	AC time overcurrent	S ①②	S ①②				S	S	S
51N	AC time ground overcurrent		O ①②	S	S		S	S	S
51V	Voltage restrained overcurrent			S	S				S
59	Overvoltage	S ①②		S	S	S	S	S	S
59G	Ground overvoltage			S	O				S
59I	Peak overvoltage			S	O				
60FL	VT fuse-loss detection			S	S			S	S
62	General purpose timers							S	
67	Phase directional overcurrent				S		S		S
67N	Residual directional overcurrent				O		S		
72	Phase/vector shift	S ②							
79	Reconnect enable time delay			S	S		S		S
81 O/U	Over/underfrequency	S ①②		S	S	S	S	S	S
81R	Rate of change of frequency				O				S

Notes

① Generator protective feature. S = Standard Function; O = Optional Function.
② Utility protective feature.

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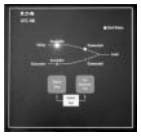
ATC-800 Transition Controller	**81**

Product Selection Guide

ATC Controller Feature Selection Chart



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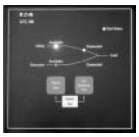
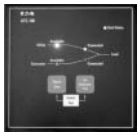
Feature Description	ATC-100	ATC-300	ATC-600	ATC-800
Transition				
Open transition	Standard	Standard	Standard	Standard
Closed transition	Not available	Not available	Not available	Standard
Timers				
Time delay normal to emergency (TDNE)	Standard	Standard	Standard	Standard
Time delay engine start (TDES)	Standard	Standard	Standard	Standard
Time delay emergency to normal (TDEN)	Standard	Standard	Standard	Standard
Time delay engine cooldown (TDEC)	Standard	Standard	Standard	Standard
Time delay emergency fail (TDEF)	Standard	Standard	Standard	Standard
Engine/Generator Exerciser				
Plant exerciser (PE) with fail-safe	Selectable—OFF, 7-, 14-, 28-day interval fixed run time 15 minutes no load/load with fail-safe	Programmable—OFF, daily, 7-, 14-, 28-day interval selectable run time 0–600 minutes no load/load with fail-safe	Programmable—OFF, daily, 7-day interval selectable run time 0–600 minutes no load/load with fail-safe	Programmable—OFF, daily, 7-day interval selectable run time 0–600 minutes no load/load with fail-safe
Source 1 Sensing				
All-phase undervoltage and underfrequency protection	Standard	Standard	Standard	Standard
All-phase overvoltage and overfrequency protection	Standard	Standard	Standard	Standard
Three-phase rotation sensing	Not available	Standard	Standard	Standard
Three-phase voltage unbalance/loss	Not available	Standard	Optional	Optional
Source 2 Sensing				
All-phase undervoltage and underfrequency protection	Standard	Standard	Standard	Standard
All-phase overvoltage and overfrequency protection	Standard	Standard	Standard	Standard
Three-phase rotation sensing	Not available	Standard	Standard	Standard
Three-phase voltage unbalance	Not available	Standard	Optional	Optional

ATC Controller Feature Selection Chart, continued



Feature Description	ATC-100	ATC-300	ATC-600	ATC-800
Manual Controls				
Test operators	Standard	Standard	Standard	Standard
Four-position test selector switch (FPSS)	Not available	Not available	Optional	Optional
Time delay bypass pushbutton	Standard	Standard	Standard	Standard
Maintenance selector switch (MSS)	Not available	Optional	Optional	Optional
Automatic/manual operation selector switch	Not available	Optional	Optional	Optional
Automatic transfer or automatic transfer with non-automatic retransfer operation	Not available	Not available	Optional	Optional
Indications/and Status Display				
Source 1 connected/Source 2 connected	Standard	Standard	Standard	Standard
Source 1 present/Source 2 present	Standard	Standard	Standard	Standard
Source 1 tripped/Source 2 tripped	Standard	Standard	Standard	Standard
Customer Outputs				
Source 1/Source 2 present contacts	Not available	Optional 2NO and 2NC	Optional 2NO and 2NC	Optional 2NO and 2NC
Source 1/Source 2 present contacts	Not available	Optional 2NO and 2NC	Optional 2NO and 2NC	Optional 2NO and 2NC
Source 1 available/Source 2 available contacts	Not available	Optional 2NO and 2NC	Optional 2NO and 2NC	Optional 2NO and 2NC
Switch Position Indication Contact				
Source 1 position indication contact	Not available	2NO and 2NC	2NO and 2NC	2NO and 2NC
Source 1 position indication contact	Not available	2NO and 2NC	2NO and 2NC	2NO and 2NC
Pretransfer signal contacts	Not available	Standard 1NO and 1NC	Optional	Optional
Customer Inputs				
Go to emergency (Source 2)	Not available	Standard	Standard	Standard
Load shed	Not available	Not available	Optional	Optional
Transfer Mode Open Transition				
Time delay neutral	Not available	Optional	Optional	Optional
In-phase monitoring	Standard	Optional	Optional	Optional
Load voltage decay	Not available	Optional	Optional	Optional
Transfer Mode Closed Transition				
Time delay neutral	Not available	Not available	Not available	Optional
In-phase monitoring	Not available	Not available	Not available	Optional
Load voltage decay	Not available	Not available	Not available	Optional
Service Entrance Rating				
Source 1, Source 2 or both and with and without ground fault protection	Not available	Optional	Optional	Optional
Stainless Steel Cover				
SS lockable cover for controller	Not available	Optional	Optional	Optional

ATC Controller Specification Selection Chart

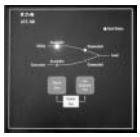


Specification Description	ATC-100	ATC-300	ATC-600	ATC-800
Programming Selections				
Time delay normal to emergency	3 seconds (fixed)	0–1800 seconds	0–1800 seconds	0–1800 seconds
Time delay emergency to normal	5 minutes (fixed)	0–1800 seconds	0–1800 seconds	0–1800 seconds
Time delay engine cooldown	5 minutes (fixed)	0–1800 seconds	0–1800 seconds	0–1800 seconds
Time delay engine start	3 seconds (fixed)	0–120 seconds	0–120 seconds	0–120 seconds
Time delay neutral	N/A	0–120 seconds	0–120 seconds or based on load voltage decay of 2%–30% of nominal	0–120 seconds or based on load voltage decay of 2%–30% of nominal
Time delay Source 2 fail	N/A	0–6 seconds	0–6 seconds	0–6 seconds
Time delay voltage unbalance	N/A	10–30 seconds	N/A	N/A
Voltage unbalance three-phase	N/A	0 or 1 (1 = enabled)	—	—
% of unbalanced voltage dropout	N/A	5% to 20% (DO) dropout –2% to 3% (PU)	N/A	N/A
Phase reversal three-phase	N/A	OFF, ABC, CBA	N/A	N/A
In-phase	N/A	0 or 1 (1 = enabled)	Enabled or disabled	Enabled or disabled
Load sequencing	N/A	N/A	Up to 10 devices (via sub-network)	Up to 10 devices (via sub-network)
Pretransfer signal	N/A	1–120 seconds (Form C contact)	0–120 seconds (up to 10 devices via sub-network)	0–120 seconds (up to 10 devices via sub-network)
Plant exerciser	Selectable day, off, 7-, 14-, 28-day interval, 15 minutes run time, no load	Programmable—off, daily or 7-, 14-, 28-day intervals, 0–600 minutes, load or no load	Programmable—disabled or 7-day interval, 0–600 minutes, load or no load	Programmable—disabled or 7- day interval, 0–600 minutes, load or no load
Preferred source selection	N/A	N/A	Source 1 or 2 or none	Source 1 or 2 or none
Commitment to transfer in TDNE	N/A	N/A	Enabled or disabled	Enabled or disabled
Retransfer mode	N/A	N/A	Automatic or manual	Automatic or manual
Auto daylight savings time adjustment	N/A	0 or 1 (1 = enabled)	—	—
System selection	Utility/generator	Utility/generator or dual utility	Utility/generator or dual utility or dual generator	Utility/generator or dual utility or dual generator
Additional information	PA01600002E	TD01602006E	TD.15A.05.T.E.	TD.15A.05.T.E.

Note

Features are order specific. Not all features are supplied as standard.

ATC Controller Specification Selection Chart, continued

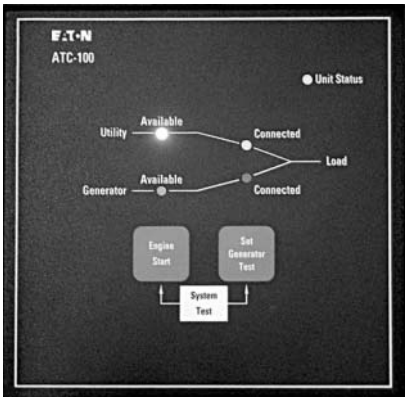
Specification Description	ATC-100	ATC-300	ATC-600	ATC-800
				
Voltage Specifications				
System application voltage	Up to 480 Vac	Up to 600 Vac	Up to 600 Vac	Up to 600 Vac
Voltage measurements of:	Source 1 and 2	Source 1 and 2—V_{AB}, V_{BC} and V_{CA}	Source 1, 2 and load—V_{AB}, V_{BC} and V_{CA}	Source 1, 2 and load—V_{AB}, V_{BC} and V_{CA}
Voltage measurement range	120–480 Vac	0–790 Vac rms	0–790 Vac rms	0–790 Vac rms
Operating power	95–145 Vac	65–145 Vac	65–145 Vac	65–145 Vac
Frequency Specifications				
Frequency measurements of:	Source 2	Source 1 and 2	Source 1 and 2	Source 1 and 2
Frequency measurement range	50–60 Hz	40–70 Hz	40–70 Hz	40–70 Hz
Environmental Specifications				
Operating temperature range	–20° to +70°C	–20° to +70°C	–20° to +70°C	–20° to +70°C
Storage temperature range	–30° to +85°C	–30° to +85°C	–30° to +85°C	–30° to +85°C
Operating humidity	0 to 95% relative humidity (noncondensing)	0 to 95% relative humidity (noncondensing)	0 to 95% relative humidity (noncondensing)	0 to 95% relative humidity (noncondensing)
Operating environment	Resistant to ammonia, methane, nitrogen, hydrogen and hydrocarbons	Resistant to ammonia, methane, nitrogen, hydrogen and hydrocarbons	Resistant to ammonia, methane, nitrogen, hydrogen and hydrocarbons	Resistant to ammonia, methane, nitrogen, hydrogen and hydrocarbons
Front Panel Indication				
Mimic diagram with LED indication	Unit status. Source 1 and 2 available and connected (five total)	Unit status. Source 1 and 2 available and connected (five total)	Automatic, test and program mode. Source 1 and 2 available, connected and preferred. Load energized (10 total)	Automatic, test and program mode. Source 1 and 2 available, connected and preferred. Load energized (10 total)
Main display	N/A	LCD-based display	LED display	LED display
Display language	N/A	English, French	English	English
Communications capable	N/A	N/A	PONI/INCOM™	PONI/INCOM
Enclosure compatibility	NEMA 1 and 3R	NEMA 1, 12 and 3R, UV-resistant faceplate	NEMA 1, 12, 3R and 4X UV-resistant faceplate	NEMA 1, 12, 3R and 4X UV-resistant faceplate
Operating environmental range	Operation –20 to +70°C Storage –30 to +85°C Humidity 0 to 95% relative (noncondensing)	Operation –20 to +70°C Storage –30 to +85°C Humidity 0 to 95% relative (noncondensing)	Operation –20 to +70°C Storage –30 to +85°C Humidity 0 to 95% relative (noncondensing)	Operation –20 to +70°C Storage –30 to +85°C Humidity 0 to 95% relative (noncondensing)

Notes

① Transfer on customer input.
② As ordered.

Features are order specific. Not all features are supplied as standard.

ATC-100 Controller



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ATC-100 Controller

Product Description

The ATC-100 Controller is a comprehensive, multifunction, microprocessor-based ATS controller. It is a compact, self-contained, panel-mounted device designed to replace traditional relay and solid-state logic panels.

Application Description

The ATC-100 Controller provides both fixed and jumper-selectable settings to allow for a range of applications. It operates from all system voltages between 120 and 480 Vac, single-phase and three-phase, at 50 or 60 Hz. In addition, a period of no control power operation is provided. The ATC-100 Controller monitors the condition of the three-phase line-to-line voltage and frequency of both the utility and generator power sources. It can also be set up for single-phase operation. The ATC-100 controller provides the necessary intelligence to ensure that the transfer switch operates properly through a series of sensing and timing functions.

The ATC-100 controller can be used with both the breaker-based design and the contactor-based design. See **Page 75** for ranges and factory settings.

Features, Benefits and Functions

Standard Features

- Auxiliary relay contacts:
  - Source 1 present 2NO and 2NC
  - Source 2 present 2NO and 2NC
- Switch position indication contacts:
  - Source 1 position 1NO and 1NC
  - Source 2 position 1NO and 1NC
- Source 1 and Source 2 sensing:
  - Undervoltage/under frequency
  - Overvoltage/over frequency
- Controller settings via jumpers located at the rear of the unit
- Mimic diagram with source available and connected LED indication
- Time-stamped history log
- System TEST pushbutton
- Selectable—OFF, daily, 7-, 14-, 28-day interval fixed run time 15 minutes no load/load with fail-safe
- Monitor utility and generator power source voltages and generator power source frequency
- Provide undervoltage protection of the utility and generator power sources
- Provide underfrequency and overfrequency protection of the utility and generator power source
- Permit easy customer setup
- Permit system testing
- Provide faceplate source status indications

Standards and Certifications

- UL listed component
- IEC 61000-4-2, 61000-4-3, 61000-4-4, 61000-4-5, 61000-4-6, 61000-4-11
- CISPR 11, Class B
- FCC Part 15, Class B

Technical Data and Specifications

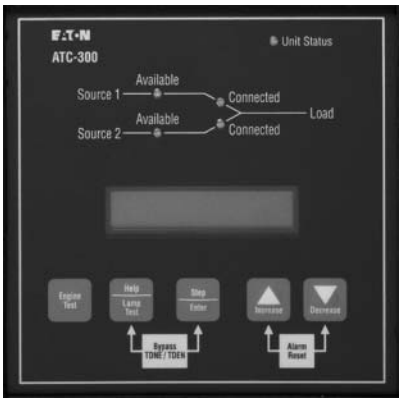
ATC-100 Controller Specifications

Description	Specification
Input control voltage	95 to 145 Vac 50/60 Hz
Voltage measurements of	Utility V_{AB} Generator V_{AB} Utility V_{BC} Generator V_{BC} Utility V_{CA} Generator V_{CA}
Voltage measurement range	0 to 575 Vac rms (50/60 Hz)
Voltage measurement accuracy	±1% of full scale
Frequency measurements of	Generator
Frequency measurement range	40 Hz to 70 Hz
Frequency measurement accuracy	±0.3 Hz over the measurement range
Operating temperature range	–20 to +70°C (–4 to +158°F)
Storage temperature range	–0 to +85°C (–22 to +185°F)
Operating humidity	0 to 95% relative humidity (noncondensing)
Operating environment	Resistant to ammonia, methane, nitrogen, hydrogen and hydrocarbons
Generator start relay	5A, 1/6 hp @ 250 Vac 5A at 30 Vdc with a 150W maximum load
K1, K2 relays	10A, 1–3 hp @ 250 Vac 10A @ 30 Vdc
Enclosure compatibility	NEMA 1, NEMA 3R and NEMA 12 UV-resistant ATC-100 faceplate

Adjustable Features with Range and Factory Default

Setpoint	Fixed/ Adjustable	Description	Range	Factory Default Breakers	Contactors
TDES	Fixed	Time delay engine start	3 seconds	3 seconds	3 seconds
TDNE	Jumper-selectable	Time delay normal to emergency	2 or 15 seconds	15 seconds	15 seconds
TDEN	Fixed	Time delay emergency to normal	5 minutes	5 minutes	5 minutes
TDEC	Fixed	Time delay engine cool-off	1 minute	1 minute	1 minute
NOM FREQ	Jumper-selectable	Nominal frequency	50 or 60 Hz	As ordered	As ordered
NOM VOLTS	Jumper-selectable	Nominal voltage	120, 208, 220, 230, 240, 380, and 480V	As ordered	As ordered
S1 UV DROP	Fixed	Utility undervoltage dropout	80% of NOMV	80% of NOMV in volts	80% of NOMV in volts
S2 UV DROP	Fixed	Generator undervoltage dropout	80% of NOMV	80% of NOMV in volts	80% of NOMV in volts
S1 UV PICK	Fixed	Utility undervoltage pickup	90% of NOMV	90% of NOMV in volts	90% of NOMV in volts
S2 UV PICK	Fixed	Generator undervoltage pickup	90% of NOMV	90% of NOMV in volts	90% of NOMV in volts
S2 UF DROP	Fixed	Utility underfrequency dropout	90% of NOMF	90% of NOMF in hertz	90% of NOMF in hertz
S2 UF PICK	Fixed	Generator underfrequency pickup	95% of NOMF	95% of NOMF in hertz	95% of NOMF in hertz
S2 OF DROP	Jumper-selectable	Generator overfrequency dropout	Off or 115% of NOMF (contactor)	Off	115%
S2 OF PICK	Jumper-selectable	Generator overfrequency pickup	Off or 110% of NOMF	Off	110%
Generator test	Jumper-selectable	Generator test programming	7-, 14- or 28-day	7-day	7-day
Test mode	Jumper-selectable	Test mode	Off, No Load, Load	Off	Off
TER	Fixed	Engine run test time	15 minutes	15 minutes	15 minutes
PHASES	Jumper-selectable	Three-phase or single-phase	1 or 3	As ordered	As ordered
TDEF	Fixed	Time delay emergency fail timer	6 seconds	6 seconds	6 seconds
TDN	Jumper-selectable	Time delay neutral	Disabled (0 seconds) or enabled (2 seconds)	Enabled (2 seconds)	Enabled (2 seconds)

ATC-300 Controller



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ATC-300 Controller

Product Description

Transfer switches are equipped with the high-performance ATC-300 digital transfer controller, receive rock-solid monitoring, status reporting and transfer control operation. Its superior design and robust construction make the ATC-300 the industry benchmark for critical and distributed power systems.

Application Description

Eaton's ATC-300 Controller-Based Automatic Transfer Switch is designed to provide unmatched performance, reliability and versatility for critical standby power applications.

Features, Benefits and Functions

Standard Features

- Auxiliary relay contacts:
  - Source 1 present 2NO and 2NC
  - Source 2 present 2NO and 2NC
- Switch position indication contacts:
  - Source 1 position 1NO and 1NC
  - Source 2 position 1NO and 1NC
- Source 1 and Source 2 sensing:
  - Undervoltage/ underfrequency
  - Overvoltage/ overfrequency
  - Three-phase rotation protection
  - Three-phase voltage unbalance
- Pretransfer signal contacts 1NO/1NC
- Go to emergency (Source 2)
- Seven field-programmable time delays
- LCD-based display for programming, system diagnostic and Help message display
- Mimic diagram with source available and connected LED indication
- Time-stamped history log
- System TEST pushbutton
- Programmable plant exerciser—OFF, daily, 7-, 14-, 28-day interval selectable run time 0–600 minutes no load/ load with fail-safe

Optional Features

- Suitable for use as service equipment in the standard enclosure size when used with breaker-based design transfer switches
- Available UL 1449 3rd Edition compliant surge protection devices
- Integrated distribution panels
- Field-selectable multi-tap transformer panel permits operation on a wide range of system voltages
- Integral overcurrent protection available when used with breaker-based design transfer switches
- Space heater with thermostat
- Ammeter—load side
- Power quality metering
- Stainless steel cover for controller

Standards and Certifications

- UL listed component
- Meets intent of UL 991, 1008
- Meets IEC 1000-4-2, 1000-4-3, 1000-4-4, 1000-4-5, 1000-4-6, 1000-4-11
- Meets CISPR 11, Class A
- Complies with FCC Part 15, Class A

Technical Data and Specifications

ATC-300 Controller Specifications

Description	Specification	
Input control voltage	65–145 Vac 50/60 Hz	
Voltage measurements of	Source 1 V_{AB} Source 1 V_{BC} Source 1 V_{CA}	Source 2 V_{AB} Source 2 V_{BC} Source 2 V_{CA}
Voltage measurement range	0–790 Vac rms (50/60 Hz)	
Voltage measurement accuracy	±2% of nominal input voltage	
Frequency measurement for	Source 1 and Source 2	
Frequency measurement range	40–70 Hz	
Frequency measurement accuracy	±0.1 Hz	
Undervoltage dropout range	50–90% of nominal voltage	
Undervoltage pickup range	(Dropout +2%) to 99% of the nominal system voltage	
Overvoltage dropout range	105–120% of nominal voltage	
Overfrequency pickup range	101% to (Dropout –1 Hz) of the nominal system frequency	
Underfrequency dropout range	90–97% of the nominal system frequency	
Underfrequency pickup range	(Dropout +1 Hz) to 99% of the nominal system frequency	
Overfrequency dropout range	103–110% of the nominal system frequency	
Overfrequency pickup range	101% to (Dropout –1 Hz) of the nominal system frequency	
Operating temperature range	–20 to +70°C (–4 to +158°F)	
Storage temperature range	–0 to +85°C (–22 to +185°F)	
Operating humidity	0–95% relative humidity (noncondensing)	
Operating environment	Resistant to ammonia, methane, nitrogen, hydrogen and hydrocarbons	
Generator start relay	5A, 1/6 hp at 250 Vac/5A at 30 Vdc with a 150W maximum load	
K1, K2, pretransfer, alarm relays	10A, 1–3 hp at 250 Vac/10A at 30 Vdc	
Enclosure compatibility	NEMA 1, NEMA 3R, and NEMA 12 UV resistant ATC-300 faceplate	

The following set points are programmable if the corresponding feature is programmed.

ATC-300 Programming Features/Set Points ①

Setpoint	Set Point Units	Description	Range	Factory Default
TDES	Minutes: seconds	Time delay engine start	0–120 seconds	0:03
TDNE	Minutes: seconds	Time delay normal to emergency	0–1800 seconds	0:00
TDEN	Minutes: seconds	Time delay emergency to normal	0–1800 seconds	5:00
TDEC	Minutes: seconds	Time delay engine cool-off	0–1800 seconds	5:00
TDN	Minutes: seconds	Time delay neutral	0–120 seconds	0:00
PLANT EXER	Days	Plant exerciser programming	Off, daily, 7-day, 14-day or 28 day	Off
TEST MODE	—	Test Mode	0, 1 or 2 (0 = no load engine test, 1 = load engine test, 2 =disabled)	0
TER	Hours: minutes	Engine run test time	0–600 min	5:00
TPRE	Minutes: seconds	Pre-transfer delay timer	0–120 sec	0:00
PHASES	—	Three-phase or single-phase	1 or 3	As ordered
VOLT UNBAL	Volts	Voltage unbalanced	0 or 1 (1 = enabled)	1
UNBAL DROP %	Percent	Percent for unbalanced voltage dropout	5–20% of phase voltage unbalance	20%
UNBAL PICK %	Percent	Percent for unbalanced voltage pickup	Dropout minus (UNBAL DROP % –2) to 3%	10%
UNBAL DELAY	Seconds	Unbalanced delay timer	10–30	0:20
TDEF	Seconds	Time delay emergency fail timer	0–6 sec	6
PHASE REV	—	Phase reversal	OFF, ABC or CBA	OFF

Note

① Complete list of programming selections found in IB01602009E

ATC-600 Controller

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ATC-600 Controller

Product Description

Eaton's ATC-600 is a microprocessor-based logic controller to be used with transfer switches. This device is door-mounted and provides the operator with an at-a-glance overview of switch status and parameters, as well as key diagnostic data. Real-time values for volts and frequency can be viewed via the front panel LED display, along with an indication of the power source currently in use.

The ATC-600 continuously monitors either single-phase or three-phase voltages for Source 1, Source 2 and the load. When the Source 1 voltage or frequency is detected to be below the customer-programmed set points, transfer to Source 2 is initiated. When the Source 2 voltage and frequency are detected to be within the programmed parameters, the transfer occurs.

While the load is connected to Source 2, the ATC-600 continues to monitor Source 1. As soon as the Source 1 voltage and frequency return to within the programmed limits, and after a programmed time delay, a retransfer back to Source 1 is initiated.

The ATC-600 uses microprocessor technology to provide the operator with a vast array of selections. Depending on the application, the user can "customize" the ATC-600 to meet the particular application. A summary of several key selections is listed in table on **Page 79.**

Application Description

The ATC-600 is equipped to display history information either via the front panel or over PowerNet™. Source 1 and Source 2 run time, available time, and connect time are available, as well as Load energized time, number of transfers, and the date, time and reason for the last 16 transfers.

For communications capability, the ATC-600 can be equipped with a PONI card that will allow the user to communicate with the unit via Series III software. All settings for purchased options can be set from the faceplate of the unit or downloaded over PowerNet. Series III software allows for charting of key historical data, as well as providing the capability to monitor and control the transfer switch from a remote location.

For further information on PowerNet products and software, see **Section 26**.

Standards and Certifications

- UL listed component

Technical Data and Specifications

ATC-600 Controller Specifications

Description	Specification		
Input control power range	65 Vac rms to 160 Vac rms (50/60 Hz)		
Voltage measurements of	Source 1 V_{AB} Source 1 V_{BC} Source 1 V_{CA}	Source 2 V_{AB} Source 2 V_{BC} Source 2 V_{CA}	Load V_{AB} Load V_{BC} Load V_{CA}
Voltage measurement range	0 to 790 Vac rms (50/60 Hz)		
Voltage measurement accuracy	±2% of nominal input voltage		
Frequency measurement for	Source 1 and Source 2		
Frequency measurement range	40 Hz to 80 Hz		
Frequency measurement accuracy	±0.1 Hz		
Undervoltage sensing	Source 1 and Source 2		
Undervoltage dropout range	50–90% of nominal voltage		
Overvoltage dropout range ①	105–120% of nominal voltage		
Underfrequency dropout range ①	90–100% of nominal frequency		
Overfrequency dropout range ①	100–120% of nominal frequency		
Contact Outputs			
Two Form A contacts for generator start	5A 250 Vac; 5A 30 Vdc		
Four Form A contacts for control functions	10A 250 Vac; 10A 30 Vdc		
Three Form C contacts for control functions	10A 250 Vac; 10A 30 Vdc		
Communications output over PowerNet (optional)	PONI (Product-Operated Network Interface)		
Front Panel Indications			
Automatic mode	Blinking LED indicates automatic operation		
Test mode	LED illuminated indicating the unit is in the TEST mode		
Program mode	LED illuminated indicating the unit is in the program mode blinking LED indicates user is viewing set points in program mode		
LED lights to indicate	Source 1 available (amber), Source 2 available (amber), Source 1 connected (green), Source 2 connected (red), Source 1 preferred (red), Source 2 preferred (red), load energized (red)		
LED display to indicate	History information Set points Real-time clock		
Operating temperature range	Operation: –20°C to +70°C/Storage: –30°C to +85°C		

Note

① Optional features.

All ATC-600 programmable features and associated setpoint possibilities with any required explanations are presented below. Remember, only features originally ordered and factory programmed will appear in the display.

Note: Changing the system nominal voltage or frequency set points will automatically change all the pickup and dropout settings to new default values.

ATC-600 Programming Features/Set Points ①

Programmable Feature Display	Display Explanation	Set Point Range	Factory Default Value	Measure
TDES	Time delay engine start timer	0–120 seconds	0:03	Minutes: seconds
TDNE	Time delay normal to emergency timer	0–1800 seconds	0:00	Minutes: seconds
TDEN	Time delay emergency to normal timer	0–1800 seconds	5:00	Minutes: seconds
TDEC	Time delay engine cool down timer	0–1800 seconds	5:00	Minutes: seconds
TDN	Time delay neutral timer	0–120 seconds	0:00	Minutes: seconds
PRF SRC	Preferred source	None 1 = source 1 0 = source 2	1	—
EXER	Plant exerciser enabled or disabled	0 = disabled 1 = enabled	1	—
MANTR	Re-transfer mode	0 = automatic 1 = PB return	0	—
CTDNE	Commitment to transfer in TDNE	0 = not commited 1 = commited	0	—
TMODE	Engine test with/without load transfer	0 = no load transfer 1 = load transfer 2 = disable test pattern	1	—
TPRE	Pre-transfer sub-network time delay	1–00 seconds	0:01	Minutes: seconds
PHASE	Number of system phases	1 or 3 ②	3	—
TSEQ	Time delay load sequencing	1–120 seconds	0:10	Minutes: seconds
IPHASE	In-phase transition enabled or disabled	1 = enabled 0 = disabled	0	—
IPFD	In-phase transition frequency difference (Hertz)	0.0–3.0 Hz	1.0	Hertz
SYNC	Closed/in-phase transition synchronization timer	1–60 minutes	5	Minutes
TDEF	Time delay engine failure	0–60 seconds	6	Seconds

Notes

① Complete list of programming selections found in IB ATS-1005.

② Set to order specific value.

ATC-800

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ATC-800 Transition Controller

Product Description

The ATC-800 is a programmable, microprocessor-based monitoring device designed for use in Eaton closed transition transfer switches and for open transition contactor-based designs. By using Eaton's ATC-800, the user may avoid intentional interruption of power when both sources of power are available. This make-before-break mode of operation is useful during testing of the engine generator under load and where a predetermined transfer to the generator is desired. Source paralleling duration is limited to less than100 msec.

Passive Closed Transition

The closed transition mode of operation requires that both power sources be synchronized in voltage, frequency and phase angle within prescribed limits. Eaton's ATC-800 uses a technique that involves waiting for synchronization of the two sources without actively controlling the generator's voltage or frequency. The mode of operation is anticipatory in that the switch close command is initiated before the sources are exactly in phase. Utilizing the phase angle and frequency difference between the two sources, a calculation is made to predict when both sources would be in phase. The response time of the switch is then factored in to determine when the switch close signal should be given to ensure optimal closure of the two sources in phase.

Eaton's closed transition ATC-800 must be selected with one of three feature sets: 47C, 47D or 47E (47D, 47F, 47G on contactor-based designs. The difference between these three feature sets is the action taken by the closed transition ATC-800 if it is determined that the two sources will not achieve synchronization. If feature set 47C is selected, failure to synchronize results in the switch reverting to an Open Transition mode of operation with low voltage decay. If feature set 47E is selected, then failure to synchronize results in the switch reverting to time delay neutral. However, if feature set 47D is selected, failure to synchronize will result in the ATC-800 refusing to transfer to Source 2 and an alarm signal being activated. In neither case will there be a paralleling of sources if synchronization is not achieved.

Application Description

- The generator used with a closed transition transfer switch must be equipped with an isynchronous governor
- When paralleling sources, fault current contributions from both sources should be considered in the system design
- Closed Transition (make-before-break) technology causes paralleling with the Source 1. It is the user's responsibility to comply with any requirements regarding protective relaying. Protective relaying is not supplied with the standard transfer switch, but is available as an option

Features, Benefits and Functions

Switch Application Section—Eaton Closed Transition (ATC-800) Features

The closed transition ATC-800 is a door-mounted, totally enclosed device that is customer accessible from the transfer switch front panel.

Data access and programming operations are performed using the ATC-800 Transfer's touch-sensitive function buttons in conjunction with an easy-to-read, illuminated, alphanumeric LED display. Both the function buttons and the display window are part of the device's front panel. A built-in Help button provides user assistance in the form of message displays.

The ATC-800 is communications ready and compatible with all Eaton IQ devices as well as the Eaton PowerNet system-wide supervisory and control software. This permits monitoring and control of several transfer switches, locally or remotely, from a single point.

Additional Features

- Source paralleling duration is limited to 100 msec or less
- True rms three-phase voltage sensing on normal, Source 2 and Load
- Frequency sensing on normal and Source 2
- Programmable set points stored in nonvolatile memory
- PowerNet communication to personal computer either on site or remote
- Historical data on most recent transfers (up to 16 events) viewable at switch. Unlimited history storage (remote) available when used with PowerNet software
- Wide range of user-selectable option combinations
- Load sequencing
- Engine start contacts
- Engine test switch with user-selectable test mode and fail-safe
- Alarm contact (multiple alarm functions available)
- Pretransfer signal
- Heartbeat monitor (flashing green Automatic light signifies that the ATC-800 is operating properly)
- Instrumentation:
  - Voltmeter (accuracy ±1%)
  - Reads line-to-line on Sources 1 and 2 and Load
  - Frequency meter (40–80 Hz, accuracy ±0.1 Hz)
  - Source available time (both sources)
  - Source connected time (both sources)
  - Source run time

ATC-800 Programming

Button Functions

Three buttons provide easy access to all commonly used ATC-800 functions.

When the preferred source is connected and the ATS is operating normally, the automatic indicator light will be flashing and the display window will be blank.

Using the Display Select button, the operator can step through each of the six display families:

- Source 1
- Source 2
- Load
- History
- Time/date
- Set points

Note: Stepping through the various display modes does not alter preset values or otherwise affect operation of the ATS.

Once the desired display family is selected, the user may press the Step button to cycle through specific parameters or metered values shown in the display window.

Initial Programming

Factory programming will load all customer-specified functions and presets. At the customer's request, Eaton will add, delete or adjust optional features.

Customer Programming

Customers may reprogram set points and other parameters to match their application, using the program switch located on the rear of the unit. Once the programming mode has been activated and the program light is flashing, the user may access set point settings by pressing the Display Select button until the set points LED is illuminated. Values for individual set points may then be altered by pressing the Increase or Decrease buttons. Once a parameter has been reset, the user advances to the next set point by pressing the Step button.

While the ATC-800 is in the program mode, the device continues to operate in accordance with the previously programmed set points and parameters. The unit is never offline, and preset values do not change until programming has been completed.

Once reprogramming is complete, the user may return the program switch to the run position. At this point, all new values are stored in the ATC-800 non-volatile memory, and the unit returns to Automatic mode.

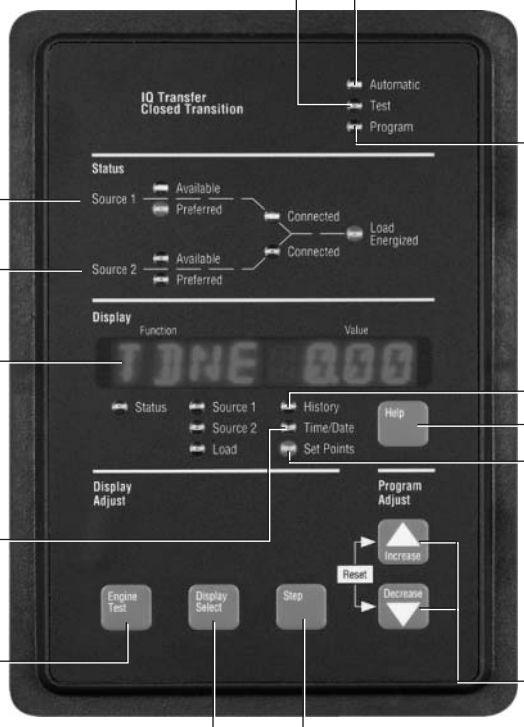
Definitions

Closed transition: Closed transition is a feature that will temporarily parallel two live sources in a make-before-break scheme when performing a transfer. The ATC-800 will close the switching devices for both sources, paralleling both sources, for a maximum time of 100 milliseconds after the sources are synchronized.

Open transition/in-phase monitor: In-phase monitor is a feature that will allow a transfer between two sources only when the phase difference between the two sources is near zero. This is an open transition transfer that prevents inrush currents from exceeding normal starting currents in the case where motor loads are being transferred.

Open transition/delayed with load voltage decay: Load voltage decay transfer is a feature that, after opening the switch for the original source, holds in the neutral position until the voltage on the load is less than 30% of rated voltage. This is an open transition that prevents inrush currents from exceeding normal starting currents in the case where motor loads are being transferred.

Closed Transition ATC-800 Front Panel Display and Button Functions



Test
Indicator light is on when unit is in Test mode.

Automatic
LED indicates that the ATS is operating normally and is in the Automatic mode.

Program
LED indicates unit is in Programming mode. (This mode is activated using the Program switch located on the rear of the unit.)

Source 1, Source 2, and Load
Colored LED lights show status of both Sources and Load.

History
By pressing the Display Select button to light the History LED and the Step button to rotate through available data, historical or cumulative values for Available Time (Both Sources), Connected Time (Both Sources), Number of Transfers and Date/Time Reason for last 16 transfers are displayed.

LED Display
Unit will provide LED readout showing actual metered values for Voltage, Frequency and Condition (including Normal, Undervoltage, Overvoltage, etc.)

Help
Pressing the Help button in any function mode will bring up display messages, explanations and prompts to assist the operator.

Time/Date
Displays real-time clock. Clock can be easily set in this mode using the Increase and Decrease buttons.

Set Points
Selecting this LED permits the user to display existing programmed values.

Engine Test Buttons
Pressing this button twice initiates an engine test.

Increase/Decrease
A detailed explanation of these buttons can be found in the Operation section.

Display Select
- Source 1
- Source 2
- Load
- History
- Time/Date
- Set Points

Button is discussed in Operation section.

Step Button
Shows multiple variables under each display select function.

Operation

The ATC-800 operates in the following modes to meet most load management applications:

- Loss of normal power
  - Open transition to alternate source
- Normal power restored
  - Closed transition back to normal source
- Peak shave (remote or local) closed transition to and from alternate source
- Test (user selectable)
  - Load transfer—closed transition to and from alternate source
  - No-load transfer—starts alternate power source and allows to run unloaded. No transfer takes place

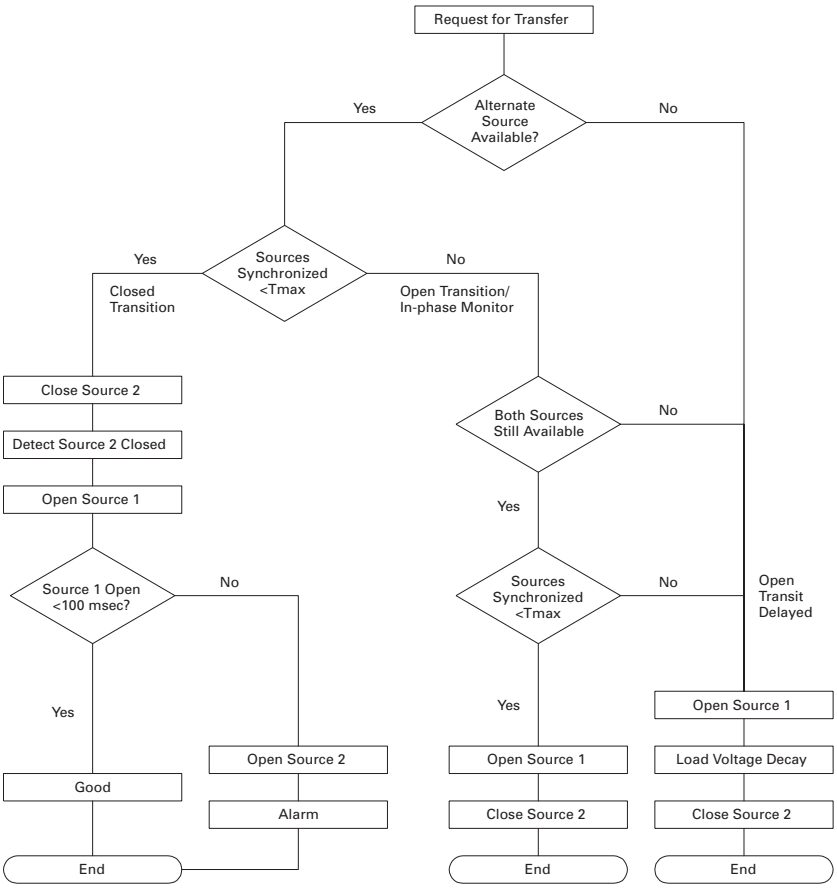
Programming and Options

Closed Transition Operation Modes

Feature Set 47C Closed/In-Phase/Load Voltage Decay

ATC-800 controllers equipped with Feature Set 47C execute the following sequence of operations upon receipt of a request for transfer: the controller waits (for a preselected time frame) for synchronization of voltage and frequency. If achieved, a closed transition transfer occurs. Failure to synchronize results in the controller defaulting to an in-phase monitor, open transition mode of operation. If the two sources fail to achieve frequency synchronization within the user-selectable range, the controller defaults to an open transition using a load voltage decay delayed transition.

Feature Set 47C Schematic



Closed Transition/In-Phase Standard Features

Standard Features	Customer Adjustments
Closed transition frequency difference (Hz)	0.0 to 0.3 Hz
Closed transition voltage difference (V)	1–5%
In-phase transition frequency difference (Hz)	0.0–0.3 Hz
Closed transition synchronization timer	1–60 minutes
In-phase transition synchronization timer	1–60 minutes

In-Phase Transfer

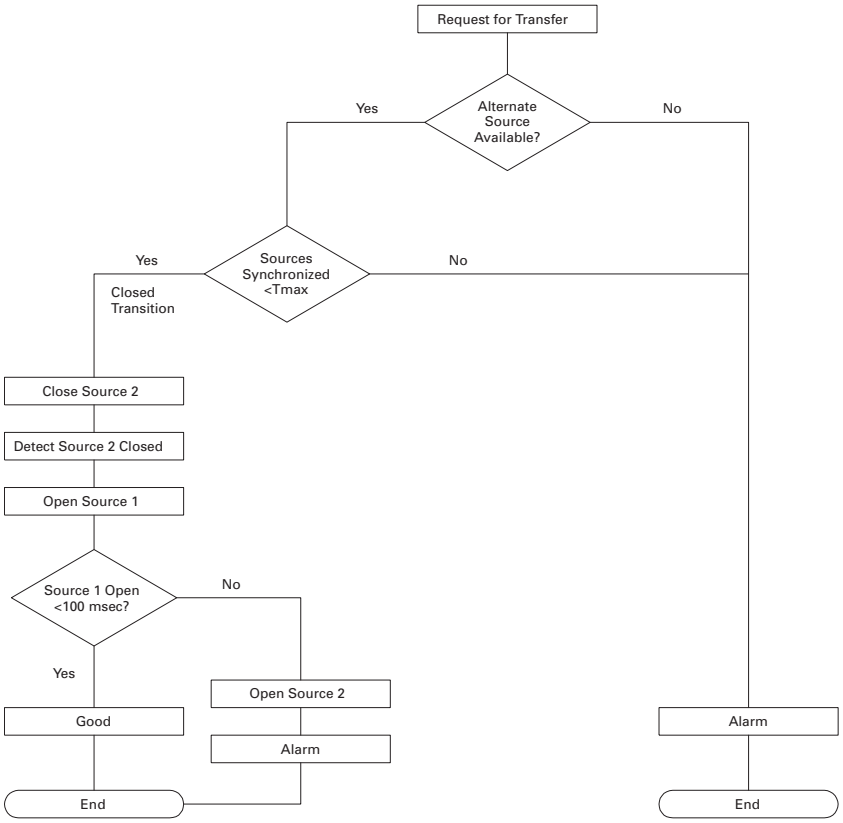
Feature Set 47D Closed Only

ATC-800 controllers equipped with Feature Set 47D only transfer to an alternate source when both sources are synchronized. For synchronization to occur, both voltage and frequency differentials must fall within the user-selectable ranges. If synchronization does not occur (within a preselected amount of time), the controller will maintain load connection to the current power source and initiate an alarm.

Closed Transition With Default to In-Phase Transition With Default to Time Delay Neutral

Provides a closed transition transfer as the primary transfer mode. In the event Source 1 and Source 2 fail to synchronize within the permitted voltage difference, frequency difference, phase angle difference and time, then the controller defaults to the In-phase transition with default to time delay neutral operation as described in **Features 32D** and **32A**. Adjustable frequency difference 0.0–0.3 Hz. Adjustable voltage difference 1–5% volts. Adjustable synchronization time allowance 1–60 minutes.

Feature Set 47D Schematic



Closed Transition Standard Features

Standard Features	Customer Adjustments
Closed transition frequency difference (Hz)	0.0–0.3 Hz
Closed transition voltage difference	1–5%
Closed transition synchronization timer	1–60 minutes

Feature Set 47F Closed/ Load Voltage Decay

ATC-800 controllers equipped with Feature Set 47F will perform a closed transition when both sources are synchronized in frequency, phase and voltage. Failure to synchronize will result in an open transition Time Delay Load Voltage Decay transfer. Time Delay Load Voltage Decay uses the load voltage measurements to sense back EMF that is generated when the transfer switch is in the Neutral position. It provides a delay in transfer in either direction if an unacceptable level is sensed as established by a customer programmed level. The transfer will not take place until the back EMF decays below the acceptable programmed level. This feature has a separate setting of enabling or disabling the operation. If disabled, the transfer switch will not delay in the Neutral position and will transfer between the sources as fast as possible. This feature is not available with the Time Delay Neutral Optional Feature 32A,

Feature Set 47G Closed/ Time Delay Neutral

ATC-800 controllers equipped with Feature Set 47F will perform a closed transition transfer when both sources are synchronized in frequency, phase and voltage. Failure to synchronize will result in an open transition Time Delay Neutral transfer. Time Delay Neutral provides a time delay in the transfer switch neutral position when both sources are open. This delay takes place when the load is transferred in either direction to prevent excessive in-rush currents due to out-of-phase switching of large motor loads.

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Contactor-Based—Automatic Transfer Switch Features

		Open Transition						Closed Transition
		RLC1	ATC1	ATC3	ATC8	BIC3	BIC8	CBC8
Feature Number	Description	Residential Contactor Switch ATC-100 Controller	Contactor Switch ATC-100 Controller 40–600A Only	Contactor Switch ATC-300 Controller 40–1200A	Contactor Switch ATC-800 Controller Open Transition	Bypass Isolation Contactor Switch Open Transition ATC-300 Controller	Bypass Isolation Contactor Switch ATC-800 Controller	Bypass Isolation Contactor Switch Closed Transition ATC-800 Controller
1	Timers							
1a	Time delay normal to emergency (TDNE) Fixed 2 seconds or 15 seconds	S	S	—	—	—	—	—
	Adjustable 0–1800 seconds	—	—	S	S	S	S	S
2	Time delay engine start (TDES) Fixed 3 seconds	S	S	—	—	—	—	—
	Adjustable 0–120 seconds	—	—	S	S	S	S	S
3	Time delay emergency to normal (TDEN) Fixed 1 minute	S	S	—	—	—	—	—
	Adjustable 0–1800 seconds	—	—	S	S	S	S	S
4	Time delay engine cooldown (TDEC) Fixed 5 minutes	S	S	—	—	—	—	—
	Adjustable 0–1800 seconds	—	—	S	S	S	S	S
5	Emergency (S2) source sensing							
5H	Phase reversal	—	—	S	O	O	O	O
5J	All-phase undervoltage/underfrequency	S	S	S	S	S	S	S
5K	All-phase overvoltage/overfrequency	—	—	S	S	S	S	S
5L	All-phase voltage unbalance and phase loss	—	—	S	—	O	—	—
5N	All-phase overfrequency	S	S	—	—	—	—	—
6	System or engine test							
6B	System test pushbutton	S	S	S	S	S	S	S
6D	Maintained two-position test switch	—	—	—	—	O	O	O
6H	Maintained four-position test switch	—	—	—	—	O	O	O

S = Standard, O = Optional

Contactor-Based—Automatic Transfer Switch Features, continued

Feature Number	Description	Open Transition RLC1 Residential Contactor Switch ATC-100 Controller	ATC1 Contactor Switch ATC-100 Controller 40–600A Only	ATC3 Contactor Switch ATC-300 Controller 40–1200A	ATC8 Contactor Switch ATC-800 Controller Open Transition	BIC3 Bypass Isolation Contactor Switch Open Transition ATC-300 Controller	BIC8 Bypass Isolation Contactor Switch ATC-800 Controller	Closed Transition CBC8 Bypass Isolation Contactor Switch Closed Transition ATC-800 Controller
7	Time delay emergency fail (TDEF) Fixed 6 seconds	S	S	—	—	—	—	—
7a	Time delay emergency fail (TDEF) Adjustable 0–6 seconds)	—	—	S	S	S	S	S
8 8C	Pushbutton bypass Bypass TDEN	—	—	S	S	S	S	S
8D	Bypass TDNE	—	—	S	S	S	S	S
9 9B	Maintenance selector switch Electrical operator isolator switch	—	—	O	O	O	O	O
10 10B	Preferred source selector Utility to utility or utility to generator	—	—	—	O	—	O	O
10D	Generator to generator	—	—	—	O	—	O	O
12C	Indicating lights Normal (S1) source connected	S	S	S	S	S	S	S
12D	Emergency (S2) source connected	S	S	S	S	S	S	S
12G	Normal (S1) source available	S	S	S	S	S	S	S
12H	Emergency (S2) source available	S	S	S	S	S	S	S
12L	Normal (S1) source tripped (requires Feature 16)	—	—	—	—	—	—	—
12M	Emergency (S2) source tripped (requires Feature 16)	—	—	—	—	—	—	—
14 14C	Auxiliary relay contacts Normal (S1) source available 4 Form C	—	—	—	—	O	O	O
14D	Emergency (S2) source available 4 Form C	—	—	—	—	O	O	O
14E	Normal (S1) source available 1 Form C	—	—	—	S	S	S	S
14F	Emergency (S2) source available 1 Form C	—	—	—	S	S	S	S
14G	Normal (S1) source available 2 Form C	—	S	S	O	O	O	O
14H	Emergency (S2) source available 2 Form C	—	S	S	O	O	O	O
15 15E	Position contacts Normal (S1) source position 1 Form C	—	S	S	S	S	S	S
15F	Emergency (S2) source position 1 Form C	—	S	S	S	S	S	S
15G	Position indicating contact normal (3 Form C)	—	O	O	O	O	O	O
15H	Position indicating contact emergency (3 Form C)	—	O	O	O	O	O	O
15M	Source 2 load shed contacts 4 Form C (must order as a separate field-installed kit)	O	—	—	—	—	—	—
16 16N	Integral overcurrent protection Normal (S1) switch only	—	—	—	—	—	—	—
16E	Emergency (S2) switch only	—	—	—	—	—	—	—
16B	Normal (S1) and emergency (S2) switches	—	—	—	—	—	—	—
16S	Service equipment /overcurrent protection (S1)	O	—	—	—	—	—	—

S = Standard, O = Optional

Contactor-Based—Automatic Transfer Switch Features, continued

Feature Number	Description	Open Transition RLC1 Residential Contactor Switch ATC-100 Controller	ATC1 Contactor Switch ATC-100 Controller 40–600A Only	ATC3 Contactor Switch ATC-300 Controller 40–1200A	ATC8 Contactor Switch ATC-800 Controller Open Transition	BIC3 Bypass Isolation Contactor Switch Open Transition ATC-300 Controller	BIC8 Bypass Isolation Contactor Switch ATC-800 Controller	Closed Transition CBC8 Bypass Isolation Contactor Switch Closed Transition ATC-800 Controller
18	Metering	—	O	O	O	O	O	O
	IQ 130	—	O	O	O	O	O	O
	IQ 140	—	O	O	O	O	O	O
	IQ 150	—	O	O	O	O	O	O
	IQ 250	—	O	O	O	O	O	O
	IQ 260	—	O	O	O	O	O	O
	PXM 2250	—	O	O	O	O	O	O
	PXM 2260	—	O	O	O	O	O	O
	PXM 2270	—	O	O	O	O	O	O
18W	Analog ammeter one per phase	—	O	O	O	O	O	O
21A	Non-standard terminals	—	—	—	—	—	—	—
23 23A	Plant exerciser Selectable—disabled/7-, 14-, 28-day interval, FIXED 15 minutes, load/no load, with fail-safe	S	S	—	—	—	—	—
23J	Selectable—disabled/7 day interval, 0–600 minutes, load/no load, with fail-safe	—	—	—	S	—	S	S
23K	Selectable—disabled/7-, 14-, 28-day interval, 0–600 minutes, load/no load, with fail-safe	—	—	S	—	S	—	—
23L	24-hour, 7-day, 365-day programmable programmable plant exciser	—	—	O	O	O	O	O
26 26D	Normal (S1) source sensing Go to emergency (S2) input	—	—	S	S	S	S	S
26H	Phase reversal protection	—	—	S	O	O	O	O
26J	All-phase undervoltage/underfrequency	—	—	S	S	S	S	S
26K	All-phase overvoltage/overfrequency	—	—	S	S	S	S	S
26L	Three-phase voltage unbalance/phase loss	—	—	S	—	—	—	—
26M	Allows operation with generator with utility sensing (option available only through a field-installed kit)	O	O	—	—	—	—	—
26P	All-phase undervoltage	S	S	—	—	—	—	—
29 29G	Alternative transfer modes of operation Selector switch for automatic or non-automatic operation (switch must be labeled as non-automatic)	—	—	O	O	O	O	O
29J	Automatic transfer operation with selectable (via programming) automatic or non-automatic retransfer operation with fail-safe	—	—	—	O	O	O	O

S = Standard, O = Optional

Contactor-Based—Automatic Transfer Switch Features, continued

Feature Number	Description	Open Transition RLC1 Residential Contactor Switch ATC-100 Controller	ATC1 Contactor Switch ATC-100 Controller 40–600A Only	ATC3 Contactor Switch ATC-300 Controller 40–1200A	ATC8 Contactor Switch ATC-800 Controller Open Transition	BIC3 Bypass Isolation Contactor Switch Open Transition ATC-300 Controller	BIC8 Bypass Isolation Contactor Switch ATC-800 Controller	Closed Transition CBC8 Bypass Isolation Contactor Switch Closed Transition ATC-800 Controller
32 32A	Delayed transfer operation modes Time delay neutral adjustable 0–120 seconds (available on three-position contactors and breaker-based design)	—	—	S	S	S	S	—
32B	Load voltage decay adjustable	—	—	—	—	O	O	—
32C	2–30% nominal voltage In-phase monitor defaults to load voltage decay	—	—	—	—	—	—	—
32D	In-phase monitor defaults to time delay neutral	—	—	—	—	—	—	—
32E	Delay transition timer adjustable 3–60 seconds	—	—	—	—	—	—	—
32F	In-phase monitor (2-position contactors only)	—	S	S	S	—	—	—
32G	Time delay neutral fixed 0 or 2 seconds (available on 3-position contactors and breaker-based design)	—	S	—	—	—	—	—
34 34A	Logic extender cable 48 inches (1219 mm)	—	—	—	—	—	—	—
34C	96 inches (2438 mm)	—	—	—	—	—	—	—
34E	144 inches (3658 mm)	—	—	—	—	—	—	—
35A	Pretransfer Sig-I contacts 1 Form C	—	—	S①	O	O	O	—
36	Load shed from emergency	—	—	—	S	—	S	S
37	Go to isolated position (not SE rated) Rated as suitable for use as service equipment② (requires 16B or 16N or 16E or 16S)	—	—	—	—	—	—	—
37A	Without ground fault protection③	O	—	—	—	—	—	—
37B	With ground fault protection	—	—	—	—	—	—	—
38 38A	Stainless steel device covers SS cover for device plate or service equipment	—	—	—	—	—	—	—
38B	Disconnect SS cover for controller	—	O	O	O	O	O	O
41 41A	Space heater with thermostat 100 watts	—	O	O	O	O	O	O
41E	375 watts	—	—	—	—	O	O	O
42	Seismic IBC, UBC	S	S	S	S	S	S	S

Notes

① Not available on 2-position contactor switches and closed transition switches.

② Select 16S for service entrance rating on RLC1.

③ Ground fault protection is required for service disconnects rated 1000A or more if the electrical service is a solidly grounded wye system of more than 150V to ground but not exceeding 600V phase to phase.

S = Standard, O = Optional

Contactor-Based—Automatic Transfer Switch Features, continued

Feature Number	Description	Open Transition RLC1 Residential Contactor Switch ATC-100 Controller	ATC1 Contactor Switch ATC-100 Controller 40–600A Only	ATC3 Contactor Switch ATC-300 Controller 40–1200A	ATC8 Contactor Switch ATC-800 Controller Open Transition	BIC3 Bypass Isolation Contactor Switch Open Transition ATC-300 Controller	BIC8 Bypass Isolation Contactor Switch ATC-800 Controller	Closed Transition CBC8 Bypass Isolation Contactor Switch Closed Transition ATC-800 Controller
45	Load sequencing contacts							
45A	Load sequencing contacts (1)	—	—	—	—	—	—	0
45B	Load sequencing contacts (2)	—	—	—	—	—	—	0
45C	Load sequencing contacts (3)	—	—	—	—	—	—	0
45D	Load sequencing contacts (4)	—	—	—	—	—	—	0
45E	Load sequencing contacts (5)	—	—	—	—	—	—	0
45F	Load sequencing contacts (6)	—	—	—	—	—	—	0
45G	Load sequencing contacts (7)	—	—	—	—	—	—	0
45H	Load sequencing contacts (8)	—	—	—	—	—	—	0
45I	Load sequencing contacts (9)	—	—	—	—	—	—	0
45J	Load sequencing contacts (10)	—	—	—	—	—	—	0
47	Closed transition operation-l modes (user must specify mode)							
47C	Closed transition in-phase with default to load voltage decay	—	—	—	—	—	—	0
47D	Closed transition	—	—	—	—	—	—	S
47E	Closed transition in-phase with defaults to time delay neutral	—	—	—	—	—	—	0
48	Communications							
48A	IPONI module (INCOM communications)	—	—	—	0	—	0	0
48D	Ethernet communication 10Base-T only (PXG400 Gateway)	—	—	—	0	—	—	0
48F	EPONI module (10Base-T and 10Base-FL) MPONI module (MODBUS)	—	—	—	0	—	0	0
48R	Remote annunciator	—	—	—	0	—	0	0
49A	Sensing isolation transformer Magnum	—	—	—	—	—	—	—
49B	Sensing isolation transformer	—	—	—	—	—	—	—
51	Surge protection device	—	0	0	0	0	0	0
51D1	50 kA CVX surge device source 1	—	0	0	0	0	0	0
51F1	100 kA CVX surge device source 1	—	0	0	0	0	0	0

S = Standard, 0 = Optional

Breaker-Based—Automatic Transfer Switch Features

Feature Number	Description	Open Transition ATV1 ATH1 Light Commercial Molded Case Switch ATC-100 Controller	ATV3 ATH3 Molded Case Switch ATC-300 Controller	ATVI ATH Molded Case Device ATC-600 Controller	NTHE NTVE Molded Case Switch Non-Automatic Transfer Switch	MTHX MTVX Molded Case Switch Manual Transfer Switch	BIHI Molded Case Switch Bypass Isolation Switch ATC-600	Closed Transition MBHE Molded Case Switch Maintenance Bypass
1 1a	Timers Time delay normal to emergency (TDNE) Fixed 2 seconds or 15 seconds	S	—	—	—	—	—	—
	Adjustable 0–1800 seconds	—	S	S	—	—	S	—
2	Time delay engine start (TDES) Fixed 3 seconds	S	—	—	—	—	—	—
	Adjustable 0–120 seconds	—	S	S	—	—	S	—
3	Time delay emergency to normal (TDEN) Fixed 1 minute	S	—	—	—	—	—	—
	Adjustable 0–1800 seconds	—	S	S	—	—	S	—
4	Time delay engine cooldown (TDEC) Fixed 5 minutes	S	—	—	—	—	—	—
	Adjustable 0–1800 seconds	—	S	S	—	—	S	—
5 5H	Emergency (S2) source sensing Phase reversal	—	S	O	—	—	O	—
5J	All-phase undervoltage/underfrequency	S	S	S	—	—	S	—
5K	All-phase overvoltage/overfrequency	—	S	S	—	—	S	—
5L	All-phase voltage unbalance and phase loss	—	S	—	—	—	—	—
5N	All-phase overfrequency	S	—	—	—	—	—	—
6 6B	System or engine test System test pushbutton	S	S	S	—	—	S	—
6D	Maintained two-position test switch	—	—	O	—	—	O	—
6H	Maintained four-position test switch	—	—	O	—	—	O	—
7	Time delay emergency fail (TDEF) Fixed 6 seconds	S	—	—	—	—	—	—
7a	Time delay emergency fail (TDEF) Adjustable 0–6 seconds)	—	S	S	—	—	S	—
8 8C	Pushbutton bypass Bypass TDEN	—	S	S	—	—	S	—
8D	Bypass TDNE	—	S	S	—	—	S	—
9 9B	Maintenance selector switch Electrical operator isolator switch	—	O	O	—	—	O	—
10 10B	Preferred source selector Utility to utility or utility to generator	—	—	O	—	—	O	—
10D	Generator to generator	—	—	O	—	—	O	—
12C	Indicating lights Normal (S1) source connected	S	S	S	S	—	S	—
12D	Emergency (S2) source connected	S	S	S	S	—	S	—
12G	Normal (S1) source available	S	S	S	S	—	S	—
12H	Emergency (S2) source available	S	S	S	S	—	S	—
12L	Normal (S1) source tripped (requires Feature 16)	—	O	O	O	—	O	—
12M	Emergency (S2) source tripped (requires Feature 16)	—	O	O	O	—	O	—

S = Standard, O = Optional

Breaker-Based—Automatic Transfer Switch Features, continued

Feature Number	Description	Open Transition ATV1 ATH1 Light Commercial Molded Case Switch ATC-100 Controller	ATV3 ATH3 Molded Case Switch ATC-300 Controller	ATVI ATH Molded Case Device ATC-600 Controller	NTHE NTVE Molded Case Switch Non-Automatic Transfer Switch	MTHX MTVX Molded Case Switch Manual Transfer Switch	BIHI Molded Case Switch Bypass Isolation Switch ATC-600	Closed Transition MBHE Molded Case Switch Maintenance Bypass
14	Auxiliary relay contacts							
14C	Normal (S1) source available 4 Form C	—	—	S	0	—	S	—
14D	Emergency (S2) source available 4 Form C	—	—	S	0	—	S	—
14E	Normal (S1) source available 1 Form C	—	—	—	—	—	—	—
14F	Emergency (S2) source available 1 Form C	—	—	—	—	—	—	—
14G	Normal (S1) source available 2 Form C	S	S	—	0	—	—	—
14H	Emergency (S2) source available 2 Form C	S	S	—	0	—	—	—
15	Position contacts							
15E	Normal (S1) source position 1 Form C	S	S	S	—	—	S	—
15F	Emergency (S2) source position 1 Form C	S	S	S	—	—	S	—
15G	Position indicating contact normal (3 Form C)	0	0	0	0	—	—	—
15H	Position indicating contact emergency (3 Form C)	0	0	0	0	—	—	—
16	Integral overcurrent protection							
16N	Normal (S1) switch only	—	0	0	0	0	0	—
16E	Emergency (S2) switch only	—	0	0	0	0	0	—
16B	Normal (S1) and emergency (s2) switches	—	0	0	0	0	0	—
16S	Service equipment /overcurrent protection (S1)	—	—	—	—	—	—	—
18	Metering	0	0	0	0	0	0	—
	IQ 130	0	0	0	0	0	0	—
	IQ 140	0	0	0	0	0	0	—
	IQ 150	0	0	0	0	0	0	—
	IQ 250	0	0	0	0	0	0	—
	IQ 260	0	0	0	0	0	0	—
	PXM 2250	0	0	0	0	0	0	—
	PXM 2260	0	0	0	0	0	0	—
	PXM 2270	0	0	0	0	0	0	—
18W	Analog ammeter one per phase	0	0	0	0	0	0	—
20A	Rear bus connections	—	0	0	0	0	—	—
21A	Non-standard terminals	0	0	0	0	0	0	—
23	Plant exerciser							
23A	Selectable—disabled/7-, 14-, 28-day interval, FIXED 15 minutes, load/no load, with fail-safe	S	—	—	—	—	—	—
23J	Selectable—disabled/7 day interval, 0–600 minutes, load/no load, with fail-safe	—	—	S	—	—	S	—
23K	Selectable—disabled/7-, 14-, 28-day interval, 0–600 minutes, load/no load, with fail-safe	—	S	—	—	—	—	—
23L	24-hour, 7-day, 365-day programmable programmable plant exciser	0	0	0	—	—	—	—

S = Standard, O = Optional

Breaker-Based—Automatic Transfer Switch Features, continued

Feature Number	Description	Open Transition ATV1 ATH1 Light Commercial Molded Case Switch ATC-100 Controller	ATV3 ATH3 Molded Case Switch ATC-300 Controller	ATVI ATH Molded Case Device ATC-600 Controller	NTHE NTVE Molded Case Switch Non-Automatic Transfer Switch	MTHX MTVX Molded Case Switch Manual Transfer Switch	BIHI Molded Case Switch Bypass Isolation Switch ATC-600	Closed Transition MBHE Molded Case Switch Maintenance Bypass
26 26D	Normal (S1) source sensing Go to emergency (S2) input	—	S	S	—	—	S	—
26H	Phase reversal protection	—	S	0	—	—	0	—
26J	All-phase undervoltage/underfrequency	—	S	S	—	—	S	—
26K	All-phase overvoltage/overfrequency	—	S	S	—	—	S	—
26L	Three-phase voltage unbalance/phase loss	—	S	—	—	—	—	—
26M	Allows operation with generator with utility sensing (option available only through a field-installed kit)	0	—	—	—	—	—	—
26P	All-phase undervoltage	S	—	—	—	—	—	—
29 29G	Alternative transfer modes of operation Selector switch for automatic or non-automatic operation (switch must be labeled as non-automatic)	—	0	0	—	—	—	—
29J	Automatic transfer operation with selectable (via programming) automatic or non-automatic retransfer operation with fail-safe	—	—	0	—	—	0	—
32 32A	Delayed transfer operation modes Time delay neutral adjustable 0–120 seconds (available on three-position contactors and breaker-based design)	—	S	S	—	—	—	—
32B	Load voltage decay adjustable	—	—	0	—	—	—	—
32C	2–30% nominal voltage In-phase monitor defaults to load voltage decay	—	—	—	—	—	—	—
32D	In-phase monitor defaults to time delay neutral	—	—	—	—	—	—	—
32E	Delay transition timer adjustable 3–60 seconds	—	—	—	S	—	—	—
32F	In-phase monitor (2-position contactors only)	—	—	—	—	—	—	—
32G	Time delay neutral fixed 0 or 2 seconds (available on 3-position contactors and breaker-based design)	S	—	—	—	—	—	—
34 34A	Logic extender cable 48 inches (1219 mm)	—	—	0	0	—	0	—
34C	96 inches (2438 mm)	—	—	0	0	—	0	—
34E	144 inches (3658 mm)	—	—	0	0	—	0	—
35A	Pretransfer Sig-I contacts 1 Form C	—	S	0	—	—	0	—
36	Load shed from emergency	—	—	S	—	—	S	—
37	Go to isolated position (not SE rated) Rated as suitable for use as service equipment ① (requires 16B or 16N or 16E or 16S)	0	0	0	—	—	—	—
37A	Without ground fault protection ②	—	0	0	0	—	0	—
37B	With ground fault protection	—	0	0	0	—	0	—
38 38A	Stainless steel device covers SS cover for device plate or service equipment disconnect	—	0	0	0	—	0	—
38B	SS cover for controller	0	0	0	0	—	0	—

Notes

① Select 16S for service entrance rating on RLC1.

② Ground fault protection is required for service disconnects rated 1000A or more if the electrical service is a solidly grounded wye system of more than 150V to ground but not exceeding 600V phase to phase.

S = Standard, O = Optional

Breaker-Based—Automatic Transfer Switch Features, continued

Feature Number	Description	Open Transition ATV1 ATH1 Light Commercial Molded Case Switch ATC-100 Controller	ATV3 ATH3 Molded Case Switch ATC-300 Controller	ATVI ATH Molded Case Device ATC-600 Controller	NTHE NTVE Molded Case Switch Non-Automatic Transfer Switch	MTHX MTVX Molded Case Switch Manual Transfer Switch	BIHI Molded Case Switch Bypass Isolation Switch ATC-600	Closed Transition MBHE Molded Case Switch Maintenance Bypass
39	Distribution panel (for 240/120V, AT3 switches only)							
39A	225A with (2) 200A feeders	—	0	—	—	—	—	—
39B	300A with (3) 200A feeders	—	0	—	—	—	—	—
39C	400A with (4) 200A feeders	—	0	—	—	—	—	—
41	Space heater with thermostat							
41A	100 watts	0	0	0	0	0	0	—
41E	375 watts	—	—	0	0	0	0	—
42	Seismic IBC, UBC	S	S	S	S	S	S	S
45	Load sequencing contacts							
45A	Load sequencing contacts (1)	—	—	0	—	—	0	—
45B	Load sequencing contacts (2)	—	—	0	—	—	0	—
45C	Load sequencing contacts (3)	—	—	0	—	—	0	—
45D	Load sequencing contacts (4)	—	—	0	—	—	0	—
45E	Load sequencing contacts (5)	—	—	0	—	—	0	—
45F	Load sequencing contacts (6)	—	—	0	—	—	0	—
45G	Load sequencing contacts (7)	—	—	0	—	—	0	—
45H	Load sequencing contacts (8)	—	—	0	—	—	0	—
45I	Load sequencing contacts (9)	—	—	0	—	—	0	—
45J	Load sequencing contacts (10)	—	—	0	—	—	0	—
47	Closed transition operation-I modes (user must specify mode)							
47C	Closed transition in-phase with default to load voltage decay	—	—	—	—	—	—	—
47D	Closed transition	—	—	—	—	—	—	—
47E	Closed transition in-phase with defaults to time delay neutral	—	—	—	—	—	—	—
48	Communications							
48A	IPONI module (INCOM communications)	—	—	0	—	—	0	—
48D	Ethernet communication 10Base-T only (PXG400 Gateway)	—	—	0	—	—	—	—
48F	EPONI module (10Base-T and 10Base-FL) MPONI module (MODBUS)	—	—	0	—	—	0	—
48R	Remote annunciator	—	—	0	—	—	0	—
49A	Sensing isolation transformer Magnum	—	—	—	—	—	—	—
49B	Sensing isolation transformer	0	0	0	—	—	—	—

S = Standard, O = Optional

Breaker-Based—Automatic Transfer Switch Features, continued

Feature Number	Description	Open Transition ATV1 ATH1 Light Commercial Molded Case Switch ATC-100 Controller	ATV3 ATH3 Molded Case Switch ATC-300 Controller	ATVI ATH Molded Case Device ATC-600 Controller	NTHE NTVE Molded Case Switch Non-Automatic Transfer Switch	MTHX MTVX Molded Case Switch Manual Transfer Switch	BIHI Molded Case Switch Bypass Isolation Switch ATC-600	Closed Transition MBHE Molded Case Switch Maintenance Bypass
51	Transient voltage surge protection (listed rating is per phase)							
51D1	50 kA—clipper device connected to Source 1	—	O	O	O	O	—	—
51E1	80 kA—clipper device connected to Source 1	—	O	O	O	O	—	—
51F1	100 kA—clipper device connected to Source 1	—	O	O	O	O	—	—
51G1	50 kA—CHSP device connected to Source 1 (240/120 Vac single-phase only)	—	O	—	O	O	—	—
51H1	75 kA—CHSP device connected to Source 1 (240/120 Vac single-phase only)	—	O	—	O	O	—	—
51J4	Telephone/modem/DSL (four lines total)	—	O	O	O	O	—	—
51K4	Cable TV/satellite cable/cable modem (two lines total)	—	O	O	O	O	—	—
51M4A	12 Vdc generator start circuit protection	—	O	O	O	O	—	—
51M4B	24 Vdc generator start circuit protection	—	O	O	O	O	—	—
51NA1	100 kA surge device w/Advisor Source1	—	O	O	O	O	—	—
51NS1	100 kA surge device w/SuperVisor Source 1	—	—	—	—	—	—	—
51NN1	100 kA surge device w/NetVisor Source 1	—	—	—	—	—	—	—
51QA1	160 kA surge device w/Advisor Source1	—	—	—	—	—	—	—
51QS1	160 kA surge device w/SuperVisor Source 1	—	—	—	—	—	—	—
51QN1	160 kA surge device w/NetVisor Source 1	—	—	—	—	—	—	—
51SA1	200 kA surge device w/Advisor Source1	—	—	—	—	—	—	—
51SS1	200 kA surge device w/SuperVisor Source 1	—	—	—	—	—	—	—
51NS1	200 kA surge device w/NetVisor Source 1	—	—	—	—	—	—	—

S = Standard, O = Optional

Magnum-Based—Automatic Transfer Switch Features

		Open Transition			Closed Transition			
		ATVIMG	NTVEMG	BIVIMG	CTVIMG	CBVIMG	CTVCMG	CBVCMG
Feature Number	Description	Magnum Fixed and Drawout Mount ATC-600 Controller	Magnum Fixed and Drawout Mount Non-Automatic Transfer	Bypass Isolation Magnum Drawout ATC-600 Controller	Magnum Fixed and Drawout Mount ATC-800 Closed Transition	Magnum Fixed and Drawout Mount ATC-800 Closed Transition	Magnum Soft Load Drawout ATC-5000 Soft Load	Bypass Isolation Soft Load Magnum Drawout ATC-5000 Soft Load
1	Timers							
1a	Time delay normal to emergency (TDNE) Fixed 2 seconds or 15 seconds	—	—	—	—	—	—	—
	Adjustable 0–1800 seconds	S	—	S	S	S	S	S
2	Time delay engine start (TDES) Fixed 3 seconds	—	—	—	—	—	—	—
	Adjustable 0–120 seconds	S	—	S	S	S	S	S
3	Time delay emergency to normal (TDEN) Fixed 1 minute	—	—	—	—	—	—	—
	Adjustable 0–1800 seconds	S	—	S	S	S	S	S
4	Time delay engine cooldown (TDEC) Fixed 5 minutes	—	—	—	—	—	—	—
	Adjustable 0–1800 seconds	S	—	S	S	S	S	S
5	Emergency (S2) source sensing							
5H	Phase reversal	0	—	0	0	0	0	0
5J	All-phase undervoltage/underfrequency	S	—	S	S	S	S	S
5K	All-phase overvoltage/overfrequency	S	—	S	S	S	S	S
5L	All-phase voltage unbalance and phase loss	—	—	—	—	—	—	—
5N	All-phase overfrequency	—	—	—	—	—	—	—
6	System or engine test							
6B	System test pushbutton	S	—	S	S	S	S	S
6D	Maintained two-position test switch	O	—	0	0	0	0	0
6H	Maintained four-position test switch	0	—	S	0	0	0	S
7	Time delay emergency fail (TDEF) Fixed 6 seconds	—	—	—	—	—	—	—
7a	Time delay emergency fail (TDEF) Adjustable 0–6 seconds)	S	—	S	S	S	S	S
8	Pushbutton bypass							
8C	Bypass TDEN	S	—	S	S	S	S	S
8D	Bypass TDNE	S	—	S	S	S	S	S
9	Maintenance selector switch							
9B	Electrical operator isolator switch	0	—	0	0	0	0	0
10	Preferred source selector							
10B	Utility to utility or utility to generator	S	—	S	S	S	S	S
10D	Generator to generator	S	—	S	S	S	S	S
	Indicating lights							
12C	Normal (S1) source connected	S	S	S	S	S	S	S
12D	Emergency (S2) source connected	S	S	S	S	S	S	S
12G	Normal (S1) source available	S	S	S	S	S	S	S
12H	Emergency (S2) source available	S	S	S	S	S	S	S
12L	Normal (S1) source tripped (requires Feature 16)	0	0	0	0	0	0	0
12M	Emergency (S2) source tripped (requires Feature 16)	0	0	0	0	0	0	0

S = Standard, O = Optional

Magnum-Based—Automatic Transfer Switch Features, continued

		Open Transition			Closed Transition			
		ATVIMG	NTVEMG	BIVIMG	CTVIMG	CBVIMG	CTVCMG	CBVCMG
Feature Number	Description	Magnum Fixed and Drawout Mount ATC-600 Controller	Magnum Fixed and Drawout Mount Non-Automatic Transfer	Bypass Isolation Magnum Drawout ATC-600 Controller	Magnum Fixed and Drawout Mount ATC-800 Closed Transition	Magnum Fixed and Drawout Mount ATC-800 Closed Transition	Magnum Soft Load Drawout ATC-5000 Soft Load	Bypass Isolation Soft Load Magnum Drawout ATC-5000 Soft Load
14 14C	Auxiliary relay contacts Normal (S1) source available 4 Form C	—	—	—	—	—	—	—
14D	Emergency (S2) source available 4 Form C	—	—	—	—	—	—	—
14E	Normal (S1) source available 1 Form C	S	—	S	S	S	S	S
14F	Emergency (S2) source available 1 Form C	S	—	S	S	S	S	S
14G	Normal (S1) source available 2 Form C	—	O	—	—	—	—	—
14H	Emergency (S2) source available 2 Form C	—	O	—	—	—	—	—
15 15E	Position contacts Normal (S1) source position 1 Form C	S	—	S	S	S	S	S
15F	Emergency (S2) source position 1 Form C	S	—	S	S	S	S	S
16 16N	Integral overcurrent protection Normal (S1) switch only	O	O	O	O	O	O	O
16E	Emergency (S2) switch only	O	O	O	O	O	O	O
16B	Normal (S1) and emergency (s2) switches	O	O	O	O	O	O	O
18	Metering	O	O	O	O	O	O	O
	IQ 130	O	O	O	O	O	O	O
	IQ 140	O	O	O	O	O	O	O
	IQ 150	O	O	O	O	O	O	O
	IQ 250	O	O	O	O	O	O	O
	IQ 260	O	O	O	O	O	O	O
	PXM 2250	O	O	O	O	O	O	O
	PXM 2260	O	O	O	O	O	O	O
	PXM 2270	O	O	O	O	O	O	O
	PX 4000	O	O	O	O	O	O	O
	PX 6000	O	O	O	O	O	O	O
	PX 8000	O	O	O	O	O	O	O
20A	Rear bus connections	O	O	O	O	O	O	O
21A	Non-standard terminals	O	O	O	O	O	O	O
23 23A	Plant exerciser Selectable—disabled/7-, 14-, 28-day interval, FIXED 15 minutes, load/no load, with fail-safe	—	—	—	—	—	—	—
23J	Selectable—disabled/7 day interval, 0–600 minutes, load/no load, with fail-safe	S	—	S	S	S	S	S
23K	Selectable—disabled/7-, 14-, 28-day interval, 0–600 minutes, load/no load, with fail-safe	—	—	—	—	—	—	—
23L	24-hour, 7-day, 365-day programmable programmable plant exciser	—	—	O	O	O	O	O

S = Standard, O = Optional

Magnum-Based—Automatic Transfer Switch Features, continued

		Open Transition			Closed Transition			
		ATVIMG	NTVEMG	BIVIMG	CTVIMG	CBVIMG	CTVCMG	CBVCMG
Feature Number	Description	Magnum Fixed and Drawout Mount ATC-600 Controller	Magnum Fixed and Drawout Mount Non-Automatic Transfer	Bypass Isolation Magnum Drawout ATC-600 Controller	Magnum Fixed and Drawout Mount ATC-800 Closed Transition	Magnum Fixed and Drawout Mount ATC-800 Closed Transition	Magnum Soft Load Drawout ATC-5000 Soft Load	Bypass Isolation Soft Load Magnum Drawout ATC-5000 Soft Load
26 26D	Normal (S1) source sensing Go to emergency (S2) input	S	—	S	S	S	S	S
26H	Phase reversal protection	0	—	0	0	0	0	0
26J	All-phase undervoltage/underfrequency	S	—	S	S	S	S	S
26K	All-phase overvoltage/overfrequency	S	—	S	S	S	S	S
26L	Three-phase voltage unbalance/phase loss	—	—	—	—	—	—	—
26M	Allows operation with generator with utility sensing (option available only through a field-installed kit)	—	—	—	—	—	—	—
26P	All-phase undervoltage	—	—	—	—	—	—	—
29 29G	Alternative transfer modes of operation Selector switch for automatic or non-automatic operation (switch must be labeled as non-automatic)	0	—	0	0	0	—	—
29J	Automatic transfer operation with selectable (via programming) automatic or non-automatic retransfer operation with fail-safe	0	—	0	0	0	—	—
32 32A	Delayed transfer operation modes Time delay neutral adjustable 0–120 seconds (available on three-position contactors and breaker-based design)	S	—	S	—	—	S	S
32B	Load voltage decay adjustable	0	—	0	—	—	0	0
32C	2–30% nominal voltage In-phase monitor defaults to load voltage decay	0	—	0	—	—	0	0
32D	In-phase monitor defaults to time delay neutral	0	—	0	—	—	0	0
32E	Delay transition timer adjustable 3–60 seconds	—	—	—	—	—	—	—
32F	In-phase monitor (2-position contactors only)	—	—	—	—	—	—	—
32G	Time delay neutral fixed 0 or 2 seconds (available on 3-position contactors and breaker-based design)	—	—	—	—	—	—	—
34 34A	Logic extender cable 48 inches (1219 mm)	—	—	—	—	—	—	—
34C	96 inches (2438 mm)	—	—	—	—	—	—	—
34E	144 inches (3658 mm)	—	—	—	—	—	—	—
35A	Pretransfer Sig-I contacts 1 Form C	0	—	0	—	—	—	—
36	Load shed from emergency	0	—	0	0	0	0	0
37	Go to isolated position (not SE rated) Rated as suitable for use as service equipment (requires 16B or 16N or 16E)	0	—	0	0	0	—	—
37A	Without ground fault protection ①	0	0	0	0	0	0	0
37B	With ground fault protection	0	0	0	0	0	0	0
38 38A	Stainless steel device covers SS cover for device plate or service equipment disconnect	0	0	0	0	0	0	0
38B	SS cover for controller	0	0	0	0	0	0	0

Note

① Ground fault protection is required for service disconnects rated 1000A or more if the electrical service is a solidly grounded wye system of more than 150V to ground but not exceeding 600V phase to phase.

S = Standard, O = Optional

Magnum-Based—Automatic Transfer Switch Features, continued

		Open Transition			Closed Transition			
		ATVIMG	NTVEMG	BIVIMG	CTVIMG	CBVIMG	CTVCMG	CBVCMG
Feature Number	Description	Magnum Fixed and Drawout Mount ATC-600 Controller	Magnum Fixed and Drawout Mount Non-Automatic Transfer	Bypass Isolation Magnum Drawout ATC-600 Controller	Magnum Fixed and Drawout Mount ATC-800 Closed Transition	Magnum Fixed and Drawout Mount ATC-800 Closed Transition	Magnum Soft Load Drawout ATC-5000 Soft Load	Bypass Isolation Soft Load Magnum Drawout ATC-5000 Soft Load
39 39A	Distribution panel (for 240/120V, AT3 switches only) 225A with (2) 200A feeders	—	—	—	—	—	—	—
39B	300A with (3) 200A feeders	—	—	—	—	—	—	—
39C	400A with (4) 200A feeders	—	—	—	—	—	—	—
41 41A	Space heater with thermostat 100 watts	—	—	—	—	—	—	—
41E	375 watts	O	O	O	O	O	O	O
42	Seismic IBC, UBC	S	S	S	S	S	S	S
45 45A	Load sequencing contacts Load sequencing contacts (1)	O	—	O	O	O	O	O
45B	Load sequencing contacts (2)	O	—	O	O	O	O	O
45C	Load sequencing contacts (3)	O	—	O	O	O	O	O
45D	Load sequencing contacts (4)	O	—	O	O	O	O	O
45E	Load sequencing contacts (5)	O	—	O	O	O	O	O
45F	Load sequencing contacts (6)	O	—	O	O	O	O	O
45G	Load sequencing contacts (7)	O	—	O	O	O	O	O
45H	Load sequencing contacts (8)	O	—	O	O	O	O	O
45I	Load sequencing contacts (9)	O	—	O	O	O	O	O
45J	Load sequencing contacts (10)	O	—	O	O	O	O	O
47 47C	Closed transition operation-I modes (user must specify mode) Closed transition in-phase with default to load voltage decay	—	—	—	O	O	O	O
47D	Closed transition	—	—	—	O	O	O	O
47E	Closed transition in-phase with defaults to time delay neutral	—	—	—	O	O	O	O
48 48A	Communications IPONI module (INCOM communications)	O	—	O	O	O	O	O
48D	Ethernet communication 10Base-T only (PXG-400 Gateway)	O	—	O	O	O	O	O
48F	EPONI module (10Base-T and 10Base-FL) MPONI module (MODBUS)	O	—	O	O	O	O	O
48R	Remote annunciator	O	—	O	O	O	O	O
49a	Sensing isolation transformer Magnum	O	—	O	—	—	—	—
49b	Sensing isolation transformer	—	—	—	—	—	—	—

S = Standard, O = Optional

Magnum-Based—Automatic Transfer Switch Features, continued

		Open Transition			Closed Transition			
		ATVIMG	NTVEMG	BIVIMG	CTVIMG	CBVIMG	CTVCMG	CBVCMG
Feature Number	Description	Magnum Fixed and Drawout Mount ATC-600 Controller	Magnum Fixed and Drawout Mount Non-Automatic Transfer	Bypass Isolation Magnum Drawout ATC-600 Controller	Magnum Fixed and Drawout Mount ATC-800 Closed Transition	Magnum Fixed and Drawout Mount ATC-800 Closed Transition	Magnum Soft Load Drawout ATC-5000 Soft Load	Bypass Isolation Soft Load Magnum Drawout ATC-5000 Soft Load
51S1B	50 kA SPD standard source 1	0	0	0	0	0	0	0
51S2B	80 kA SPD standard source 1	0	0	0	0	0	0	0
51S3B	100 kA SPD standard source 1	0	0	0	0	0	0	0
51S4B	120 kA SPD standard source 1	0	0	0	0	0	0	0
51S5B	160 kA SPD standard source 1	0	0	0	0	0	0	0
51S6B	200 kA SPD standard source 1	0	0	0	0	0	0	0
51S7B	250 kA SPD standard source 1	0	0	0	0	0	0	0
51S8B	300 kA SPD standard source 1	0	0	0	0	0	0	0
51S9B	400 kA SPD standard source 1	0	0	0	0	0	0	0
51S1C	50 kA SPD standard with surge counter source 1	0	0	0	0	0	0	0
51S2C	80 kA SPD standard with surge counter source 1	0	0	0	0	0	0	0
51S3C	100 kA SPD standard with surge counter source 1	0	0	0	0	0	0	0
51S4C	120 kA SPD standard with surge counter source 1	0	0	0	0	0	0	0
51S5C	160 kA SPD standard with surge counter source 1	0	0	0	0	0	0	0
51S6C	200 kA SPD standard with surge counter source 1	0	0	0	0	0	0	0
51S7C	250 kA SPD standard with surge counter source 1	0	0	0	0	0	0	0
51S8C	300 kA SPD standard with surge counter source 1	0	0	0	0	0	0	0
51S9C	400 kA SPD standard with surge counter source 1	0	0	0	0	0	0	0
51SC8	Remote display panel cable (8 feet standard)	0	0	0	0	0	0	0
51SC12	Remote display panel cable (12 feet)	0	0	0	0	0	0	0
51SC4	Remote display panel cable (4 feet)	0	0	0	0	0	0	0
53a	Beckwith M-3410A protective relay	—	—	—	—	—	0	0
53b	Schweitzer SEL-547 protective relay	—	—	—	—	—	0	0
53c	Basler BE1-951 protective relay	—	—	—	—	—	0	0
53d	Beckwith M-3520 protective relay	—	—	—	—	—	0	0
53e	Schweitzer SEL-351 protective relay	—	—	—	—	—	0	0
53f	Basler BE1-IPS100 protective relay	—	—	—	—	—	0	0
53g	FP-5000 multi-function protective relay	—	—	—	—	—	0	0
54a	Front-access cabinet (Magnum design only)	0	—	0	0	0	0	0
55b	Source 1 bottom mounting	0	—	0	0	0	0	0
57a	Magnum breaker lift device (1)	0	0	0	0	0	0	0
57b	Magnum breaker lift device (2)	0	0	0	0	0	0	0
58a	Shutterless cassette	S	S	S	S	S	S	S
58b	Shuttered casette	0	0	0	0	0	0	0
59a	Silver-plated bus	S	S	S	S	S	S	S
59b	Tin-plated bus	0	0	0	0	0	0	0

S = Standard, O = Optional

Feature Description

Timers

1. Time Delay Normal to Emergency (TDNE)

Provides a time delay to allow for the generator to warm up before transferring the load to the emergency source. Timing begins only after the Emergency Source becomes available and is deemed good based on the programmable voltage and frequency set points in the controller.

2. Time Delay Engine Start (TDES)

Provides a time delay before initiating the generator start cycle. This is to account for momentary power outages or voltage fluctuations of the normal source. Provides a Form C contact to the generator starter circuit.

3. Time Delay Emergency to Normal (TDEN)

Provides a time delay of the retransfer operation to permit stabilization of the normal source. Timing begins only after the normal source becomes available and is deemed good based on the programmable voltage and frequency set points in the controller. This function is fail-safe protected.

4. Time Delay Engine Cooldown (TDEC)

Provides a time delay before initiating the generator stop cycle after the retransfer operation. This allows the generator to cool down by running unloaded. Timing begins on completion of the retransfer cycle.

7. Time Delay Emergency Fail (TDEF)

Provides a time delay that prevents a connected emergency source from being declared "unavailable" based on the customer's set points. This is to account for momentary generator fluctuations. If the Source 2 remains in a failed state, then 0.5 second after the TDEF timer expires the transfer switch will proceed with the programmed sequence for retransfer if Source 1 is available. This time delay is only implemented when Source 2 is a generator.

Note: This feature is also enabled when large loads cause generator output to drop below customer set points.

Plant Exerciser

23A. Plant Exerciser With Fail-Safe

Provides a means for automatic testing of the engine generator set or standby power system. All programmed time delays in the controller will be performed during plant exerciser operations.

Programmable set points for test intervals are start time, either disabled, daily, 7, 14 or 28 days.

15-minute fixed engine test time.

Test may be performed with or without load transfer. Test may be manually cancelled during the operation. This function is fail-safe protected.

23J. Plant Exerciser (PE) With Fail-Safe

Provides a means for automatic testing of the engine generator set or standby power system. All programmed time delays in the controller will be performed during the plant exerciser operation.

Programmable set points for test interval are start time, either disabled or 7 days, and engine test time.

Test may be performed with or without a load transfer. Test may be manually cancelled during the operation. This is a fail-safe operation.

23K. Plant Exerciser With Fail-Safe

Provides a means for automatic testing of the engine generator set or standby power system. All programmed time delays in the controller will be performed during plant exerciser operations.

Programmable set points for test intervals are start time, either disabled, daily, 7, 14 or 28 days, engine test time.

Test may be performed with or without load transfer. Test may be manually cancelled during the operation. This function is fail-safe protected.

Source 1 Sensing

26. Source 1—Monitoring and Protection

Provides Source 1 monitoring and protection functions. If Source 1 fails, then the automatic transfer controller will begin the sequence of operations necessary to transfer the load to Source 2. All **Feature 26** monitoring and protection functions are fail-safe operations.

26H. Three-Phase Rotation Protection

Provides three-phase reversal sensing in order to protect against transferring to an out-of-phase source. The controller will treat the opposite source as unavailable if the sources are out of phase, based on programmable set points in the controller.

26J. All-Phase Undervoltage/ Underfrequency Protection

Provides all-phase undervoltage/underfrequency monitoring and protection based on programmable set points in the controller.

26K. All-Phase Overvoltage/ Overfrequency Protection

Provides all-phase overvoltage/overfrequency monitoring and protection based on programmable set points in the controller.

26L. Three-Phase Voltage Unbalance/ Phase Loss

Provides phase loss detection from blown fuses on the Source 1.

26M. Generator Utility Sensing

Allows for the switch to operate with generators that have internal utility sensing. This option comes as a kit that needs to be field installed.

26N. All-Phase Undervoltage Protection

Provides undervoltage protection for Source 1 (ATC-100 Controller only).

Source 2 Sensing

5. Source 2—Monitoring and Protection

Provides monitoring and protection based on the Source 2 voltage and/or frequency set points. All **Feature 5** monitoring and protection functions are fail-safe operations.

5J. All-Phase Undervoltage/ Underfrequency Protection

Provides undervoltage/ underfrequency monitoring and protection based on programmable set points in the controller.

5K. All-Phase Overvoltage/ Overfrequency Protection

Provides overvoltage/ overfrequency monitoring and protection based on programmable set points in the controller.

5H. Three-Phase Rotation Protection

Provides three-phase reversal sensing in order to protect against transferring to an out-of-phase source. The controller will treat the opposite source as unavailable if the sources are out of phase, based on programmable set points in the controller.

5L. Three-Phase Voltage Unbalance/Phase Loss

Provides phase loss detection from blown fuses on the Source 2 supply circuit.

Manual Controls

6B. Best Operators

Automatic transfer switches are provided with a test pushbutton that simulates a loss of the Source 1 as standard. All programmed time delays (TDNE, TDEN, etc.) will be performed as part of the test. Engine run time of the test is equal to the plant exerciser programmed set point. All tests are fail-safe protected.

6H. 4-Position Test Selector Switch (FPSS)

Provides a 4-position, maintained contact selector switch marked "Auto," "Test," "Engine Start," and "Off." The FPSS is fail-safe protected, except for the "Off Position." Transfer switch operation is determined by the switch position. Transfer switch operations are as follows:

"Auto"—Automatic operation mode.

"Test"—A load test is performed until the switch is moved to another position.

"Engine Start"—A no-load test is performed until the switch is moved to another position.

"Off"—The automatic transfer controller and engine start contact are disabled. A white pilot light is provided to indicate that the FPSS is in the "Off" position.

Note: This option will force the switch to be marked as non-automatic based on UL 1008.

8. Time Delay Bypass Pushbutton

Provides a momentary contact pushbutton to bypass the TDNE (**Feature 1**) and/or TDEN (**Feature 2**) time delays. The Time Delay Bypass Pushbutton contact, when closed, will reduce any or all of the programmed time delay to zero. Must be executed when TDNE or TDEN timer is displayed on the controller.

8C. Bypass Time Delay Emergency to Normal (TDEN)

8D. Bypass Time Delay Normal to Emergency (TDNE)

9B. Maintenance Selector Switch (MSS)

Provides a 2-position, maintained contact selector switch marked "Operate" and "Disable." When the MSS is placed in the "Disable" position, the controller logic will be disconnected from the transfer motor circuit. The MSS is placed in the "Operate" position for normal automatic operation.

29. Transfer Operation Modes

Provides standard or optional transfer modes, mode selection devices and operational methods for Transfer Switches.

29G. Automatic/Manual Operation With Selector Switch

Provides 2-position selector switch (labeled Auto/manual) that permits selection of the automatic or manual transfer. When in the "Auto" position, the transfer switch operates with fully automatic transfer, retransfer and generator startup and shutdown operations. When in the "Manual" position, manual operation is required to initiate the generator startup or retransfer with generator shutdown operations.

Note: Transfer switches with **Feature 29G** must be labeled as non-automatic transfer switch equipment.

29J. Automatic Transfer or Automatic Transfer With Non-Automatic Retransfer Operation

Provides a field-selectable programmable set point that permits the transfer switch to operate in one of the following two transfer modes (A or B):

A. Fully automatic operation.

B. Automatic engine/generator startup and automatic transfer operation from Source 1 to Source 2. Manual pushbutton operation is required to initiate the retransfer operation and engine/generator shutdown. The pushbutton for manual retransfer operation is included. This is fail-safe protected.

10. Preferred Source Selector

Provides a means to designate either Source 1 or Source 2 as the "Preferred" source. The "Preferred" source is the source that the transfer switch will connect the load to if it is available.

Note: This is a programmable software feature not an actual switch.

10B. Preferred Source Selector

Provides a programmable source selector for use on systems comprised of dual utility or utility and engine/generator power sources.

10D. Preferred Source Selector

Provides a programmable source selector for use on systems comprised of dual engine/generator power sources. (Dual engine starting circuits are provided.)

Indications and Status Display

12C. Source 1—Load Connected

Provides a green indication that indicates the load is connected to Source 1 when lit.

12D. Source 2—Load Connected

Provides a red indication that indicates the load is connected to Source 2 when lit.

12G. Source 1—Present

Provides a white or amber indication "Depending on the Controller" that Source 1 has power; however, this does not indicate whether Source 1 is acceptable.

12H. Source 2—Present

Provides an amber indication that Source 2 has power; however, this does not indicate whether Source 2 is acceptable.

Overcurrent Trip Indication

Available only with integral overcurrent protection (**Feature 16**) (shown on automatic transfer controller display).

12L. Source 1 Trip Indication

The automatic transfer controller display will read "Lockout" if the Source 1 circuit breaker is in the "tripped" position.

12M. Source 2 Trip Indication

The automatic transfer controller display will read "Lockout" if the Source 2 circuit breaker is in the "tripped" position.

Customer Outputs

14. Relay Auxiliary Contacts

14C. Source 1 Present

Provides 4 Form C relay auxiliary contacts. The relay is energized when Source 1 is present.

14D. Source 2 Present

Provides 4 Form C relay auxiliary contacts. The relay is energized when Source 2 is present.

14E. Source 1 Available

Provides 1 Form C relay auxiliary contact. The relay is energized when Source 1 is available and within the controller's programmable set points.

14F. Source 2 Available

Provides 1 Form C relay auxiliary contact. The relay is energized when Source 2 is available and within the controller's programmable set points.

14G. Source 1 Present

Provides 2 Form C relay auxiliary contacts. The relay is energized when Source 1 is available and within the controller's programmable set points.

14H. Source 2 Present

Provides 2 Form C relay auxiliary contacts. The relay is energized when Source 2 is available and within the controller's programmable set points.

15. Switch Position Indication Contact

Provides a contact that indicates if the power switching device is in the "open" or "closed" position.

15E. Source 1 Position Indication Contact

Provides 1 Form C contact that indicates the position of the Source 1 power switching device.

15F. Source 2 Position Indication Contact

Provides 1 Form C contact that indicates the position of the Source 2 power-switching device.

15M. Source 2 Load Shed Contacts

Provides 4 Form C contacts to initiate a load circuit disconnect while on Source 2. This gives the user the capability of selectively choosing not to run certain loads while on Source 2.

35A. Pretransfer Signal With 1 Form C Contact

Provides a signal prior to the transferring of the load. Will not transfer until the programmable delay set point in the controller is reached. If both sources are not available, this option will ignore the time delay set in the controller.

Customer Inputs

26D. Go to Emergency (Source 2)

Provides the capability for an external contact closure to initiate a transfer to the Source 2 power source. This includes starting the generator, performing the programmed time delays and the transfer operation. Retransfer will occur when the external contact is opened. This is a fail-safe function.

36. Load Shed From Emergency

Provides the capability for an external NC contact to initiate a load circuit disconnection from the Source 2 power source. If the load circuit is connected to Source 2 and the contact is opened, then a retransfer to Source 1 is completed if Source 1 is available. If Source 1 is not available, then the transfer switch will transfer to neutral. If the load circuit is connected to Source 1 and the contact is open, then a transfer Source 2 is prohibited.

16. Integral Overcurrent Protection

Provides thermal-magnetic overcurrent protection integral to the power switching device(s). All **Feature 16** options include a "Lockout" function. If the power switching breaker trips on an overcurrent condition, then "Lockout" is displayed on the automatic transfer controller display and automatic operation is prevented until the appropriate source is manually reset. On non-automatic switches, a blue light is supplied to indicate the "lockout."

16B. Integral Overcurrent Protection on Both Power Source Switching Devices

Provides integral overcurrent protection on both Source 1 and Source 2 power switching devices.

16E. Integral Overcurrent Protection on the Source 2 Power Switching Device

Provides integral overcurrent protection on the Source 2 power switching device.

16N. Integral Overcurrent Protection on the Source 1 Power Switching Device

Provides integral overcurrent protection on the Source 1 power switching device.

16S. External Overcurrent Protection on the Source 1 Power Switching Device

Provides overcurrent protection on the Source 1 power switching device.

18. Metering

The ATS controller provides voltage and frequency readings. If additional metering functions are required, Eaton offers a series of digital meters that may be added to the ATS. The meter type can provide simple current and voltage readings or more capable meters providing Power, Demand and energy readings.

Available with an optional communications interface. (See **Feature 48**—Communications for available communication modules.)

Feature 18 metering options include all required external devices (CTs, etc.) for a fully functioning metering system.

IQ 130/140/150

IQ 130

This digital meter provides basic current and voltage per phase (L-L, L-N) and min./max. readings (I, V). Optional communication RS-485, Modbus RTU.

IQ 140

In addition to basic current and voltage, will provide frequency, power measurements real, reactive and apparent power, total (W, VAR, VA). Optional communication RS-485, Modbus RTU.

IQ 150

In addition to basic current/voltage/frequency and power readings, will provide Energy Real reactive and apparent (Wh, VAR, Vah). Optional communication RS-485, Modbus RTU.

IQ 250/260

IQ 250

This digital meter provides current per phase and current demand, voltage (L-L, L-N) and frequency. Power, energy and demand readings. Real, reactive and apparent power and energy, power factor. RS-485 communications, Modbus RTU or ASCII. Optional I/O slots available.

IQ 260

In addition to all of the features of the IQ 250, power quality analysis is available with THD voltage and current per phase.

Power Xpert 2000

Provides either a Power Xpert PXM 2250, PXM 2260 or PXM 2270 meter.

Power Xpert 4000, 6000, 8000

Provides one of the Power Xpert meters with or without graphic displays.

18W. Ammeter Side Metering

Provides an ammeter for monitoring the load side circuit.

20A. Rear Bus Provisions

Provides Source 1, Source 2 and Load Circuit rear accessible bus stabs with provision for bus bar connection. Eaton transfer switches are provided with either front or rear (dependant on switch type) connected solderless screw-type terminals for power cable connection as standard.

21A. Optional Power Cable Connection Terminals

Eaton transfer switches are provided as standard with Source 1, Source 2 and load circuit solderless screw-type terminals for power cable connection. Alternate terminal wire sizes, and compression lug provisions may be available dependant on transfer switch type and ampere rating.

32. Delayed Transition Transfer Modes for Open Transition Transfer Switches

Provides delayed transition transfer modes for an open transition transfer switch. Often used in systems with inductive loads, a delayed transition transfer switch may prevent or reduce inrush currents due to out-of-phase switching of inductive loads.

32A. Time Delay Neutral

Provides a time delay in the neutral position during the transfer and retransfer operations during which both Source 1 and Source 2 are disconnected from the load circuit. This allows inductive loads time to reach a safe voltage and eliminate back EMF. The time delay is programmable and is the same for both transfer and retransfer operations. This is a passive feature that requires the consulting engineer/ installer to determine the settings based on how the user will operate the facility. Adjustable 0–120 seconds.

32B. Load Voltage Decay

Provides load voltage measurement to sense back EMF that is generated when the transfer switch is the neutral position. It provides a delay in transfer in either direction if an unacceptable level is sensed as established by a programmed set point. This is an active feature that adapts to how the facility is operating in order to minimize neutral position wait time, but ensure safety. Adjustable 2–30% of nominal voltage.

32C. In-Phase Transition With Default to Load Voltage Decay

Provides in-phase transition, which is a feature that will permit a transfer or retransfer between two available sources that have a phase angle difference near zero. The in-phase transition feature includes permissible frequency difference and synchronization time set points. In the event Source 1 and Source 2 fail to synchronize within the permitted frequency difference and time, then the controller defaults to the load voltage decay operation as described in **Feature 32B**. Adjustable frequency difference 0.0–3.0 Hz. Adjustable synchronization time allowance 1–60 minutes.

32D. In-Phase Transition With Default to Time Delay Neutral

Provides in-phase transition, which is a feature that will permit a transfer or retransfer only between two available sources that have a phase angle difference near zero. The in-phase transition feature includes permissible frequency difference and synchronization time set points. In the event Source 1 and Source 2 fail to synchronize within the permitted frequency difference and time, then the controller defaults to the time delay neutral operation as described in **Feature 32A**. Adjustable frequency difference 0.0–3.0 Hz. Adjustable synchronization time allowance 1–60 minutes.

32F. In-Phase Transition

Provides in-phase transition, this feature will permit a transfer or retransfer between two available sources that have a phase angle difference of 8 degrees or less. The in-phase transition feature includes permissible frequency difference and synchronization time set points. In the event Source 1 and Source 2 fail to synchronize within the permitted frequency difference and time, the Alarm relay will energize and "Failed to Sync" will be displayed on Line 1 of the controller. After resetting the alarm, another in-phase transition may be attempted or a non-synchronized transfer may be initiated by failing the connected source. The adjustable frequency difference is 0.0 to 3.0 Hz. If the synchronization does not occur within a specified amount of time, the Alarm relay will energize and the failure will be logged into the transfer history as either "Sync Fail - Freq" or "Sync Fail - Phase" depending on whether the frequency difference or the phase difference was excessive.

32G. Time Delay Neutral

This feature provides a time delay in the neutral position during the transfer and retransfer operations during which both the utility source and the generator source are disconnected from the load circuit. TDN cannot be implemented on a transfer switch using a 2-position contactor.

Jumper selectable at disable (0 seconds) or enable (2 seconds).

47. Transfer Modes for Closed Transition Transfer Switches

Provides available transition transfer modes for a closed transition transfer switch. Closed transition is a "make before break" transfer and retransfer scheme that will parallel (a maximum of 100 ms) Source 1 and Source 2 providing a seamless transfer when both sources are available. The closed transition feature includes permissible voltage difference frequency difference and synchronization time allowance set points. The phase angle difference between the two sources must be near zero for a permitted transfer. These are all programmable set points in the controller.

47C. Closed Transition With Default to In-Phase Transition With Default to Load Voltage Decay

Provides a closed transition transfer as the primary transfer mode. In the event Source 1 and Source 2 fail to synchronize within the permitted voltage difference, frequency difference, phase angle difference and time, then the controller defaults to the in-phase transition with default to load voltage decay operations as described in **Features 32C** and **32B**. Adjustable frequency difference 0.0–0.3 Hz. Adjustable voltage difference 1–5% volts. Adjustable synchronization time allowance 1–60 minutes.

47D. Closed Transition

Provides a closed transition transfer as the primary transfer mode. Only under a fail-safe condition (i.e., loss of the connected source) will the controller transfer to the alternate source using the load voltage decay operation as described in **Feature 32B**. Adjustable frequency difference 0.0–0.3 Hz. Adjustable voltage difference 1–5% V.

47E. Closed Transition With Default to In-Phase Transition With Default to Time Delay Neutral

Provides a closed transition transfer as the primary transfer mode. In the event Source 1 and Source 2 fail to synchronize within the permitted voltage difference, frequency difference, phase angle difference and time, then the controller defaults to the in-phase transition with default to time delay neutral operation as described in **Features 32D** and **32A** and . Adjustable frequency difference 0.0–0.3 Hz. Adjustable voltage difference 1–5 percent volts. Adjustable synchronization time allowance 1–60 minutes.

Logic Extender Cable

34A. 48 Inches (1219 mm)

Provides logic extension cable with connectors.

34C. 96 Inches (2438 mm)

Provides logic extension cable with connectors.

34E. 144 Inches (3658 mm)

Provides logic extension cable with connectors.

37. Service Equipment Rated Transfer Switch

Provides the label "suitable for use as service equipment" and the features necessary to meet the requirements for the label. Includes service disconnect with visible indication and neutral assembly with removable |link. **Feature 16B** or **16N** must be selected separately.

37A. Service Equipment Rated Transfer Switch Without Ground Fault Protection

Provides service equipment rating for an application that does not require ground fault protection.

37B. Service Equipment Rated Transfer Switch With Ground Fault Protection

Provides service equipment rating for an application that requires ground fault protection.

38. Steel Cover

Provides protection for a device panel as option 38a and protection for the controller as option 38b.

39. Distribution Panel

The distribution panel feature utilizes a panelboard design with bolt-on circuit breakers type EHD. Bolt-on breakers are designed to hold up to the changes in temperature and humidity that an industrial application calls for. (240/120 Vac single-phase systems only.)

39A. 225A With (2) 200A Feeders

39B. 300A With (3) 200A Feeders

39C. 400A With (4) 200A Feeders

41. Space Heater With Thermostat

Provides a space heater and adjustable thermostat. External control power is not required. Availability is dependent on transfer switch type.

41A. Space Heater With Thermostat—100 Watt

Provides 100-watt space heater with an adjustable thermostat.

41E. Space Heater With Thermostat—375 Watt

Provides 375-watt space heater with an adjustable thermostat.

42. Seismic Certification

Provides a seismic certified transfer switch with certificate for application that is seismic Zone 4 under the California Building Code (CBC), the Uniform Building Code (UBC) and BOCA, and International Building Code (IBC).

45. Load Sequencing Capability

Provides the capability for sequential closure of up to 10 addressable relays after a transfer. Each addressable relay provides (1) Form C contact. A single adjustable time delay between each of the relay closures is provided. Operates via a sub-network. Adjustable 1–120 seconds.

45A. Load Sequencing Contact

Provides (1) addressable relay.

45B. Load Sequencing Contact

Provides (2) addressable relays.

45C. Load Sequencing Contact

Provides (3) addressable relays.

45D. Load Sequencing Contact

Provides (4) addressable relays.

45E. Load Sequencing Contact

Provides (5) addressable relays.

45F. Load Sequencing Contact

Provides (6) addressable relays.

45G. Load Sequencing Contact

Provides (7) addressable relays.

45H. Load Sequencing Contact

Provides (8) addressable relays.

45I. Load Sequencing Contact

Provides (9) addressable relays.

45J. Load Sequencing Contact

Provides (10) addressable relays.

48. Communication Modules

Provides communications modules for the ATC-300, ATC-600 and ATC-800 transfer switch controllers.

48A. INCOM

Communication (IPONI)

Provides Eaton's proprietary INCOM protocol communications modules.

48D. Ethernet

Communication (PXG400 Gateway)

Translates Modbus RTU, QCPort or INCOM to Modbus TCP. The PXG400 Gateway includes embedded Web server monitoring of up to 64 connected devices. (Includes the IPONI with the ATC-600 and ATC-800 controllers.)

48F. Modbus

Communication (MPONI)

Provides Modbus RTU protocol via communications module.

48R. Remote Annunciator

Provides remote monitoring of source availability, source position and test status for the ATC-600 and ATC-800 controllers. Operates via the controller sub-network.

48RC. Remote Annunciator with Control

Provides remote monitoring and control via a color touch screen display for the ATC-300, ATC-600 and ATC-800 controllers. Operates using Modbus protocol (MPONI required for the ATC-600 and 800).

Surge Protection Device

Two type of surge protection devices are used in Eaton automatic transfer switches. Both types meet the requirements for UL 1449 3rd Edition for surge suppression devices and are CE marked. The type CVX is used on Eaton wallmount ATS designs and the Eaton type SPD are used on floor-standing designs.

CVX

The CVX device features a Thermally Protected Metal Oxide Varistor technology and comes with high intensity LED phase status indicators.

SPD

The SPD features a Thermally Protected Metal Oxide Varistor technology. It comes with dual-colored protection status indicators for each phase and for neutral-ground protection mode. It comes with an audible alarm with silence button and a Form C contact.

An optional SPD with surge counter feature package is available. This provides six-digit surge counter with reset button.

Field Kits Available

Replacement controllers as, well as field upgrade kits, are available and identified by style numbers.

Controller Field Kits—
8160A00G X X
Consult factory for correct selection for group number.

Option Field Kits—
8160A X X G X X
Consult factory for correct selection of style number.

51S1B. 50 kA—SPD standard source 1

51S2B. 80 kA—SPD standard source 1

51S3B. 100 kA—SPD standard source 1

51S4B. 120 kA—SPD standard source 1

51S5B. 160 kA—SPD standard source 1

51S6B. 200 kA—SPD standard source 1

51S7B. 250 kA—SPD standard source 1

51S8B. 300 kA—SPD standard source 1

51S9B. 400 kA—SPD standard source 1

51S1C. 50 kA—SPD standard with surge counter source 1

51S2C. 80 kA—SPD standard with surge counter source 1

51S3C. 100 kA—SPD standard with surge counter source 1

51S4C. 120 kA—SPD standard with surge counter source 1

51S5C. 160 kA—SPD standard with surge counter source 1

51S6C. 200 kA—SPD standard with surge counter source 1

51S7C. 250 kA—SPD standard with surge counter source 1

51S8C. 300 kA—SPD standard with surge counter source 1

51S9C. 400 kA—SPD standard with surge counter source 1

51SC8. Remote display panel (8 feet standard)

51SC12. Remote display panel (12 feet)

51SC4. Remote display panel (4 feet)

54. Front Access

54A. Front access cabinet available for all Magnum products. This option will add an additional pull section mounted on the side of the switch.

59a. Silver-Plated Bus

Silver-plated bus is a standard feature for all Magnum-based designs.

59b. Tin-Plated Bus

Tin-plated bus is available as an option for Magnum-based designs.

Glossary

With respect to their use in this document and as they relate to switch operation, the following terminology is defined:

Available—A source is defined as "available" when it is within its undervoltage/overvoltage/underfrequency/overfrequency (if applicable) set point ranges for the nominal voltage and frequency setting.

Fail-safe—A feature that prevents disconnection from the only available source and will also force a transfer or retransfer operation to the only available source.

Retransfer—Retransfer is defined as a change of the load connection from the secondary to primary source.

Source 1—is the primary source or normal source or normal power source or normal. (Except when Source 2 has been designated the "Preferred Source.")

Source 2—is the secondary source or emergency source or emergency power source or emergency or standby or backup source. (Except when Source 2 has been designated the "Preferred Source.")

Source 1—Failed or fails—Source 1 is defined as "failed" when it is outside of its undervoltage or overvoltage or underfrequency or overfrequency (if applicable) set point ranges for the nominal voltage and frequency setting.

Source 2—Failed or fails—Source 2 is defined as "failed" when it is outside of its undervoltage or overvoltage or under-frequency or overfrequency (if applicable) set point ranges for the nominal voltage and frequency setting for a time exceeding 0.5 seconds after the time delay emergency fail (TDEF) time delay expires.

Transfer—"Transfer" is defined as a change of the load connection from the primary to secondary source except when specifically used as "Transfer to Neutral."

Transfer to Neutral—"Transfer to Neutral" is defined as when the load circuits are disconnected from both Source 1 and Source 2.

Transient Voltage Surge Suppression

Eaton's Clipper Power System —Visor™ series transient voltage surge suppression (TVSS) components can be integrated into any closed transition soft load switch. Surge current ratings 100 kA, 160 kA and 200 kA per phase provide a range of cost-effective facility-wide protection solutions. Status indication on each phase is standard with any TVSS option. Metering and communication capabilities are also available. See Appendix C for details.

Communications

Optional communication capability via Communication Gateway is available, allowing remote data access, control, programming, system interface and dispatch.

System Interface

A system control panel provides a user-friendly interface to the closed transition soft load controller, allowing operators to easily monitor the switching devices position and manually test the generator and the system operations.

Switching Devices Status Lights

- Source 1 open (green)
- Source 1 closed (red)
- Source 1 trip (amber)
- Source 2 open (green)
- Source 2 closed (red)
- Source 2 trip (amber)

Front Panel Control Switches and Lights

The combination of the following pilot devices can be implemented on the unit:

- AUTO/TEST switch
- SYSTEM TEST switch
- TEST MODE switch
- ALARM SILENCE switch
- READY FOR OPERATION lamp (white)—verifies the ATC-5000 status

Optional Intergral Overcurrent Protection Capability

For service entrance applications, Digitrip microprocessor-based trip units can be integrated into the power switching devices. This eliminates the need for the separate upstream protective device, saving installation cost and space. Available with various combinations of long, short, instantaneous and ground fault protection, Digitrips can communicate with Eaton's IMPACC and PowerNet Power Management Systems.

Optional On-Board 24 Vdc Power Supply

On-board 24 Vdc power supply circuit, consisting of two 12 Vdc gel-cell UPS type batteries and battery charger, is available on the unit to provide DC control power to soft load transfer switch components. Engine battery can be connected in the "best battery" circuit as well, further improving the system's reliability.

Optional Components

Description	
Service Entrance Rating	
16N	Overcurrent protection—normal
16E	Overcurrent protection—emergency
16B	Overcurrent protection—both
37A	Service entrance
37B	Service entrance with ground fault
Metering	
18O	IQ Analyzer—normal
18P	IQ Analyzer—emergency
18Q	IQ Analyzer—N/E selectable
18U	IQ Analyzer—load
Plant Exerciser	
23J	Automatic 24 hours/7 days selectable load/no load
Expanded Controller I/O	
25A	Additional discrete and analog I/O for Genset control and monitoring
Space Heater and Thermostat	
41C	400W heater with thermostat
Surge Protection	
51M4B	Engine control (24 Vdc) surge device
51NA1	100 kA surge device with AdVisor Source 1
51NS1	100 kA surge device with SuperVisor Source 1
51NN1	100 kA surge device with NetVisor Source 1
51QA1	160 kA surge device with AdVisor Source 1
51QS1	160 kA surge device with SuperVisor Source 1
51QN1	160 kA surge device with NetVisor Source 1
51SA1	200 kA surge device with AdVisor Source 1
51SS1	200 kA surge device with SuperVisor Source 1
51SN1	200 kA surge device with NetVisor Source 1
On-Board 24 Vdc Power Supply	
24C	Battery charger and gel-cell batteries
Protective Devices	
53A	Beckwith M-3410A
53B	Schweitzer SEL-547
53C	Basler BE1-951
53D	Beckwith M-3520
53E	Schweitzer SEL-351
53F	Basler BE1-IPS100
Communication	
54B	External Communication Gateway
54C	Serial Modbus Over Ethernet
Field Startup	
56A	2-day startup (includes 1 day for travel)

Contents

Description

Appendix A—kW Conversion Chart

Appendix A—kW Conversion Chart

kW to Ampere Conversion Chart

Three-Phase Ampere Table at Common Line-to-Line Voltage

kW ①	200V	208V	220V	230V	240V	380V	400V	415V	460V	480V	600V
5.0	18	17	16	16	15	9	9	9	8	8	6
7.5	27	26	25	24	23	14	13	13	12	11	9
10.0	36	34	33	31	30	19	18	17	16	15	12
15.0	54	52	49	47	45	28	27	26	24	23	18
20.0	72	69	66	63	60	38	36	35	31	30	24
25.0	90	87	82	78	75	47	45	43	39	38	30
30.0	108	104	98	94	90	57	54	52	47	45	36
40.0	144	139	131	126	120	76	72	70	63	60	48
50.0	180	173	164	157	150	95	90	87	78	75	60
60.0	217	208	197	188	180	114	108	104	94	90	72
75.0	271	260	246	235	226	142	135	130	118	113	90
80.0	289	278	262	251	241	152	144	139	126	120	96
100.0	361	347	328	314	301	190	180	174	157	150	120
125.0	451	434	410	392	376	237	226	217	196	188	150
150.0	541	520	492	471	451	285	271	261	235	226	180
175.0	631	607	574	549	526	332	316	304	275	263	210
200.0	722	694	656	628	601	380	361	348	314	301	241
250.0	902	867	820	784	752	475	451	435	392	376	301
300.0	1083	1041	984	941	902	570	541	522	471	451	361
350.0	1263	1214	1148	1098	1052	665	631	609	549	526	421
400.0	1443	1388	1312	1255	1203	760	722	696	628	601	481
500.0	1804	1735	1640	1569	1504	950	902	870	784	752	601
600.0	2165	2082	1968	1883	1804	1140	1083	1043	941	902	722
700.0	2526	2429	2296	2197	2105	1329	1263	1217	1098	1052	842
800.0	2887	2776	2624	2510	2406	1519	1443	1391	1255	1203	962
900.0	3248	3123	2952	2824	2706	1709	1624	1565	1412	1353	1083
1000.0	3609	3470	3280	3138	3007	1899	1804	1739	1569	1503	1203

Note

① At 0.8 power factor.

16.7 Transfer Switches

Appendix